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Further Evidence on Thames Pollution.

A PARLIAMENTARY Return of great interest has just been published, containing copies of or extracts from correspondence which has passed between the Secretary of State for the Home Department on the one hand, the Metropolitan Board of Works, the authorities of the City of London, and others, on the other, as to the pollution of the River Thames by sewage. The correspondence commences, in January, 1882, by a representation made by the Town Clerk of London to the Secretary of State, to the effect that the Port of London Sanitary Committee of the Corporation, "guided by personal inspection, and the results of careful chemical analysis of the water of the Thames, urge upon the Government, under the provisions of the Metropolis Local Management Act of 1858, cap. 104, section 31," the extreme importance of taking steps towards "remedying that which must be admitted to be a great and growing evil."

The Home Office applying for further particulars, the Town Clerk encloses the Report of the Port Sanitary Committee, together with a letter to that body from the Medical Officer of the Port of London, containing the analysis of the water. "The worst specimen examined was the one taken at Barking on the 23rd of November, when the tide was running down, and which is reperted to contain one-fifth of its volume of sewage."

Upon this the Home Office call for reply from the Metropolitan Board of Works, whose clerk answers on April 4, "that the water of the Thames is not so pure as may be wished may be admitted without hesitation, but there are other sources of pollution than the Metropolitan Sewage outfalls, which would go far to account for the conditions which give rise to complaint." The Board go on to say that the statements with respect to the polluted condition of the river "are, if not totally unfounded, greatly exaggerated," and "wish to continue the investigations it is now making during the time when hot weather prevails." We need not follow the system of fencing of which the key-note is struck in the above letter. An old report, signed by Sir J. W. Bazalgette, and Messrs. Law and Chatterton, of April 15, 1878, in reply to Captain Calver's report of the preceding October to the Conservators of the Thames, is reproduced, together with a report of about the same date signed by Mr. T. W. Keates, Consulting Chemist to the Board; and one by Dr. Dupré, Chemist to the Medical Department of the Local Government Board.

It should be noticed, as a marked characteristic of the line of defence adopted by the Metropolitan Board of Works, that the last-named reporters say that their attention has been called to the quantity and character of the solid matter suspended in the river water. This limitation of the analysis to suspended matter, instead of total solids, was rendered possible by the error of the Thames Conservators, who attempted to prove a material silting up of the river, instead of taking the broad ground of the nuisance caused by the outfalls. The effect has been to give, as the outcome of chemical analysis, an average of 23·06 grains of suspended matter per gallon, while the analysis made for the Woolwich Board of Health by Mr. G. W. Wigner, F.C.S., on September, 1878, showed that the surface-water in Limehouse Reach contained 516 grains, or considerably more than one ounce in the gallon, of organic matter dissolved in the water. Mr. Wigner further points out that the samples analysed by Messrs. Keates & Dupré were taken when the river was in flood, and when a large discharge of upland water substituted pure for impure water throughout the whole course of the river. Whatever excuse there may have been for adducing Mr. Keates's report in reply to the charge of producing material obstructions to the river, there can be none for sending, in 1884, to the Home Secretary a statement so eminently calculated to mislead in the broader inquiry instituted by the Sanitary Port Authority.

On 22nd May, 1882, the Secretary to the Local Government Board writes to the Home Department to the effect that the condition of the Thames has been so often the subject of complaint that it is impossible to avoid an investigation, adding "the officers of the Metropolitan Board of Works have been persistent in the denial of the existence of any serious nuisance at the outfall," and for this reason the Board think it essential that the inquiry should not be postponed until a date when the Commission will not be able to satisfy themselves by personal observation of the effect produced by the outfall works during the hot weather. This part of the return concludes by a copy of the Royal Commission, headed by the distinguished name of Baron Bramwell, issued to inquire into and report upon the system under which sewage is discharged into the Thames by the Metropolitan Board of Works, dated 22nd June, 1882.

Of the first report of this Commission we spoke at the time of its appearance (vol. xlvi. p. 221). On the 14th of July last, the Secretary of State for the Home Department wrote to the chairman of the Metropolitan Board of Works, stating that in consequence of reports that he had received he had personally consulted Lord Bramwell, the chairman of the Commission, as to the state of the Thames, and had received from him a letter which he transcribes. "On Wednesday last," it runs, "five of the Sewage Commissioners, of whom I was one, went to examine the condition of the river. I do not like to use strong language, but, unless I do, I cannot adequately express my opinion. The river was in such a state as to be a disgrace and a scandal to the metropolis and civilisation. We went on it at Woolwich Dockyard. It was for its whole breadth black sewage, with a stench intolerable. We proceeded up the river, and traced the sewage nearly to Limehouse. Up to Greenwich it appeared unmixed sewage, then patches of natural water appeared, which increased till the sewage ended. The tide had then two hours to flow, and I cannot see why some sewage should not reach London Bridge, or nearly. We then went down the river, and again encountered the sewage till we got to Barking outfall, where the water was tolerably pure. The distance was ten miles of sewage, more or less."

The Home Secretary next calls attention to the fact that at the time when the Metropolitan Board obtained their powers to construct the main drainage, by the Act of 1855, it was understood that the sewage, if discharged at the present outfall, should be purified and deodorised. And he concludes that unless he is satisfied that ample and adequate means have been taken to abate the nuisance described in the police reports, and the letter of Lord Bramwell, it will be his duty to take action under the statute 20 & 21 Victoria, c. 104, s. 34.

On the 21st of July, the Chairman of the Metropolitan Board of Works replies that the experience of twenty years has shown that any injurious or offensive results of the discharge of the metropolitan sewage "only occur under the combined conditions of a reduced flow of water in the river, and a high temperature, such as existed during the latter part of June and the early part of the present month of July. These combined conditions occur, generally speaking, only at distant intervals, and prevail only for a short time." At the beginning of July, he continues, the estimated flow of the river at Teddington was only 400,000,000 gallons per day, or 50,000,000 more than the minimum flow. At the same time, the temperature in the shade has been as high as 86 degrees. Since the 10th of July, he adds (the day after Lord Bramwell's visit), "the whole of the sewage at both outfalls has been thoroughly dedorised, and care has, from the

first, been taken to flush the main sewers under the Board's control." Further, "furnaces and pans are now being erected, at which the Board itself will manufacture the deodorising material required."

A partial report of the visit of the Commissioners to the Thames is given by the Secretary of the Commission on July 23. On the 26th of July the Secretary to the Local Government Board points out that the letter of the Metropolitan Board of Works gives no definite information as to the means adopted by them for the deodorisation of the sewage at the outfalls, and offers to send one of their Engineering Inspectors to visit the spot. A communication is next printed from the East and West India Dock Company, complaining that no less than 400 tons of sewage enter their docks from the river at every tide, and that 37,300 tons of sewage mud have been removed from the docks within three months.

On the 2nd of August the Clerk to the Metropolitan Board of Works writes to the Home Department "to observe that the allegation which the Board contested, and the correctness of which it still denies, is that the river was generally in such a condition, owing to the sewage discharged into it, as to be offensive and injurious to health;" and concludes, "the complaint, so far as relates to the offensive smell arising from the latter, has been remedied." This cheering view, however, is not shared by the Secretary of State, who replies on the 5th of August that "the reports received from the police show that the state of the river, due to the sewage, has been by no means remedied by the measures recently adopted by the Metropolitan Board of Works, and that the enclosed report indicates that the state of things appears to have become worse in the last few days, showing that the scheme of deodorisation now in practice is not effectual for its purpose."

On the 7th of August the Secretary to the Commission writes to the Secretary of State, who has called for another report, to say that on the 30th of July the river was inspected by one of the Commissioners, and by several of them on the following day, and that "there did not seem to be any evidence of material improvement by the treatment of the sewage adopted by the Metropolitan Board . . . . A scum arising from chloride of lime was floating about in many places," resulting from a process "likely to be injurious to the river in other ways, and which can be only regarded as a temporary expedient to palliate a state of things that ought to have a more suitable permanent remedy." The Metropolitan Board, on the 9th of August, "much regrets to receive the expression of opinion," by the Secretary of State, "and the more so, because it conflicts with the results of the observations both of the Board's professional advisers and of Members of the Board themselves, a number of whom visited the neighbourhood of Woolwich last Saturday (a very warm day) and could detect no offensive smell from the water." The dispute is kept up in numerous short letters, and on the 18th of August the Secretary to the Commission writes that on the 14th of August the river was decidedly worse than before, but that on the 15th it had improved.

Daily reports from the superintendent of the Thames division of the Metropolitan Police are added, generally to the effect that there is no improvement. These reports would be of more value if they had stated the temperature. This we have taken the pains to ascertain, at a point higher in the Thames system than Woolwich, but which may serve as a comparative guide. On the 9th of August "the river water appears to be in as bad a condition as ever." The temperature on that day was 79·5°. On the following days the temperature was as follows:—Aug. 11, 79°; Aug. 12, 69·5°; Aug. 13, 63·8°; Aug. 14, 66°; Aug. 15, "no improvement," 69°; Aug. 16, 69°, "clearer and much better on the flood"; Aug. 18, 72°, "still further improvement"; Aug. 19, 68°, "slight improvement sustained"; Aug. 20, 65°, "still a steady improvement in the state of the river water, both in colour and smell." The series of thermometric readings is enough to show to what cause that improvement is due.

It only remains to speak of what is probably the most important of the sixty documents contained in the Parliamentary paper now under review. This is the report of Mr. John Thornhill Harrison, M. Inst. C.E., an inspector of the Local Government Board, to the president of that Board, under date of August 13th, 1884. Mr. Harrison states that he has examined the state of the river on seven occasions. To make his remarks the clearer he has prepared a sketch of the course of the Thames, on the scale of four miles to the inch, divided into five-mile lengths, above and below Crossness, from Teddington Lock to Southend, a total distance of 62·15 miles. He has added a table showing the volumes of water in each of these portions of the river, at both high and low water, of both springs and neaps, as well as the volumes of salt water in the same at springs. We must refer to the patient and lucid document itself for the details. The conclusion from this part of the investigation is "that at the present time there is a month's sewage from the metropolis oscilllating backwards and forwards between Greenhithe and Teddington."

Thus far Mr. Harrison only confirms the statements put forward in 1877 by the Conservators of the Thames, on the report of Captain Calver, R.N., F.R.S.,—statements which, as we have seen, are fully supported by the judicial testimony of Lord Bramwell. But the special value of Mr. Harrison's report lies here. He has not confined his observations to the floating island of sewage which has been steadily increasing in extent from the opening of the main outfalls to the present time. He has examined also the river above Bridge. He reports that "the water during high spring tides is polluted even up to Richmond; and it leaves a foul deposit on the banks of the river and on the towing-path. . . . . The Thames in its present condition can only be compared to a huge sewage-tank, which now for many months has not been cleaned out: it is notorious that under such circumstances the sludge, wherever it settles, becomes putrescent, and most offensive."

"The Metropolitan Board of Works," Mr. Harrison continues, "deny altogether that there is any deposit of sludge in the Thames from their sewage. I feel confident that this contention is no longer tenable." Here is the kernel of the whole matter. Relying on an Act of Parliament which Sir W. Harcourt, in his letter of the 14th of July, intimates to have been obtained under conditions hitherto unfulfilled, the Board of Works have, up to the present time, defied alike the Conservators of the Thames, the Port Sanitary Authority, the Local Government Board, the Home Office, and we may say the public sense of truth and of sanitary principle. It is tolerably clear that they are likely to resist any proceedings which the Home Secretary may institute under Section 34 of the Metropolis Management Amendment Act of 1848. And such is the effect of the neglect to institute proper control by the Acts of Parliament constituting the Metropolitan Board, that it is at least conceivable that the latter might continue to defy any interference short of that of Parliament, based on complaints as to the state of the Thames below London.

But the very object of calling the Board into existence was "to prevent the sewage of the Metropolis from passing into the Thames within the Metropolis." This object, according to the report of Mr. Harrison, has been entirely missed. If, therefore, the Home Office take the action that they indicate, in which they will be thoroughly supported by public opinion, it is on the facts now adduced by Mr. Harrison that their success will, we apprehend, depend.

Mr. Harrison states that between 17 tons and 18 tons of chloride of lime was used by the Metropolitan Board daily from the 10th to the 21st of July, at a cost of about 2,000*l.* per week. The imperfect action of this disinfectant has been pointed out. Mr. Dibdin, who has charge of the work, is now making manganate of soda at Crossness, and will shortly manufacture 20 tons a day. The cost of this is not stated; but on the 8th of August last Sir Charles Dilke stated in the House of Commons that the cost of permanganate of potash was about 130*l.* per ton. We thus obtain intimation of a cost ranging from 100,000*l.* to 675,000*l.* a year as likely to follow from the concentration of the refuse of 5,000,000 persons in one locality, for the purpose of turning it bodily into the river. It is only the more costly disinfectant that succeeds. And this is because the large dose of oxygen which it contains actually burns up that effete organic matter which is the source of the sewage poison. It deserves not only serious consideration, but the test of experiment, whether precipitation, followed by the actual combustion of this organic matter, which itself would supply the fuel, will not prove at once more certain and more cheap than the application of this costly chemical product. We recommend the study of this report to our readers.

TURNING AND MECHANICAL MANIPULATION.*

FROM a literary point of view, the votaries of the art of turning have little cause to complain that justice has not been done to the lathe both as regards its history, construction, and manipulation; in fact, with the exception, perhaps, of the steam-engine, more has been written about it and the wonders it can accomplish, than upon any other branch of mechanical engineering.

The old books by Bergeron, Teubers, and others, are well known, and do infinite credit to the writers; but the subject has never been so exhaustively treated,—whether taken from a scientific or practical standpoint,—as by the Holtzapffels, father and son. The present volume, No. V. of a series of six, is by the son, John Jacob Holtzapffel, and is a continuation of the important work designed and begun by the father.

In the introduction the author deals briefly with the early history of turning, and says that probably the earliest record of what may be called ornamental turning is that described by Virgil, Bucol. Ecl. III., v. 36, translated by Dryden as,—

"Two bowls I have well turned, of beechen wood," &c.

He also quotes Pliny and other old writers, but we think that the antiquity of the lathe, not only in Europe, but in Asia and Africa, has already been proved to demonstration, and drawings of lathes used by the Kabyles and other African tribes many hundreds of years ago are still in existence.

In Section I. the Division Plate and Index are dealt with at length. In speaking of the cutting action of tools the author justly urges that to secure perfection in work every cut in every series of operations should be perfectly regular and equal in disposition and depth, and,—given a perfectly-constructed lathe,—this, with skilful attention and with ordinary materials to work on, can be obtained. With difficult materials, however, which vary in density,—such as stones or marbles containing in places shelly fossil deposit, which is often hard and crystalline,—it has been found a matter of extreme difficulty to obtain equal cuts, an ordinary straight tool often springing from or digging into the material. For this kind of work saucer-shaped revolving cutters of chilled cast-iron or steel can be used with advantage, as these roll over the material they are cutting. The dead contact is small, and the friction is, therefore, much reduced, and the cuts are much more regular than with a fixed tool.

The author now refers to the grinding of angular, straight, and curvilinear-edged tools, and gives much useful information thereon. We agree with the recommendation that tools with flat-cutting edges should be ground mechanically instead of by hand, as by fixing them in an indexed quadrant frame any desired cutting-angle may readily be obtained, and the

* "Turning and Mechanical Manipulation." Vol. V. "The Principles and Practice of Ornamental or Complex Turning." By John Jacob Holtzapffel, A.M.I.C.E. London: Holtzapffel & Co.

result is absolutely accurate. This is especially applicable to broad-faced tools.

In Section II. the author deals with form and ornament and materials, in a concise and able manner. Section III. treats on the different methods of chucking work,—we need hardly say a matter of very great importance to the ornamental turner, and one not always carefully done. Much useful information on this subject is to be found in vol. iv. of the author's work.

Chapter III. deals with slide-rests for ornamental turning and the application of fluting stops. Illustrations of a cradle, quadrant, and counting ratchet, designed by the author, are also given; for high-class complex turning these should be found extremely useful. To obviate the unevenness and uncertainty of the advance of the slide-rest and cutting-tool, when traversed by hand, Mr. Holtzapffel gives descriptions and illustrations of several kinds of automatic driving-gear, including a tangent-screw gear, in which the micrometer and worm-wheel are in one solid. Ashton's automatic driving-gear is also described; this gear carries its own fluting stops, which, as they determine the extent of the traverse, throw the tangent screw out of action. Further on, Ronald's curvilinear apparatus (contrived about 1830), which translates a rectilinear into a curved traverse, is noticed, and, as we read it, the author considers that this application of a guide principle contains the germ of all turning and carving machinery for the production of fac-similes.

We have no wish to deny Mr. Ronalds any honour to which he is justly entitled, but we think the author will find he is quite in error in ascribing to Mr. Ronalds the honour of being the introducer of the guide principle for the production of *fac-similes*, as previously to the present century Condamine describes in his work how a lathe may be made to turn irregular figures by means of tracers moved over the surface of models, and we have before us illustrations of two machines constructed by the great engineer Watt, in the year 1809, for the production of *fac-similes* of carving, or sculpture in marble, alabaster, or wood. These machines are still in existence, together with samples of busts and bas-reliefs produced by them, and are to be seen in the "Watt Room" at the residence of Mr. George Tangye, Heathfield Hall, near Birmingham. As the matter is of some interest, we give a short description of these machines. Of the two machines constructed, one was designed for reproducing of the same size as the original, and the other for making a copy of a reduced size.

The first machine Watt called an "Eidograph," and it consisted, firstly, of an ordinary lathe with treadle and fly-wheel, to supply the motive power; and, secondly, of two tall uprights, about 7 ft. high, carrying at the top a slide on a strong horizontal bar, the slide being capable of motion horizontally either at a slow or quick speed.

Then, hinged to this slide is a light square frame of metal, and, at the outer edge of this another light square frame of metal is hinged, so that the lower end of such frame is capable of motion up and down, or in and out, like an elbow joint, and horizontally when the top slide is moved. The weight of these frames is balanced by levers and balance-weights and chains above, and the lower edge of the second frame is furnished with a "feeler" or "guide" to traverse over the original model. There is a noticeable feature in the frames above mentioned, and that is, that in order to prevent their springing or going "winding" they are practically formed into solids by the erection of the outlines of a pyramid on each; this plan gives extreme stiffness at the expense of very little weight. With this machine undercutting as well as straight cutting can be performed. Watt called his second machine for making reduced copies a "Diminishing Machine." In this he employed a stout hollow tube, forming a long lever, fulcrumed at one end on a universal joint, so that the other end can be moved in any direction about the centre. This lever carries a "feeler" or blunt point near its outer end, and a drill near the fulcrum. The slides above named slide on the bed of the lathe, and are moved by a pentagraph or arrangement of levers. A further motion is provided for turning round the original and the copy, as is sometimes necessary when undercutting a bas-relief, and, of course, when copying the round figure.

Again, Thomas Blanchard, of Philadelphia, invented his well-known copying-lathe in 1819: in this, too, a "dummy" or model and tracer guide are employed.

Chapter IV. contains lucid descriptions of the construction and working of the various cutting-frames and the revolving tools used in complex shaping and ornamenting, with illustrations in autotype taken from executed work. This is followed by a chapter on one of the most important classes of tools used in the production of elaborate work, viz., the different forms of drills for ornamental recessing and piercing purposes, and of these the author gives a large number of illustrations, rightly urging the necessity of keeping their profiles absolutely true, or high-class work is an impossibility. A number of illustrations of patterns,—chiefly used for surface ornamentation,—produced by the eccentric cutting frame are now given: many of these are extremely complex, but some of them exhibit remarkable beauty of design. Plate 14 illustrates in autotype a very elaborate specimen of inlaid eccentric and concentric turning executed by an amateur, Mr. T. Brocklebank. It is in the shape of a plaque of African blackwood, with medallions ornamented with camwood, and edged by tulip-wood and ivory. Great ingenuity has often been exhibited in such work as this, and it has a beauty of its own in a geometric sense; but its artistic value is very low, compared with the means which go to produce it.

In Chapter VI., elliptical, epicycloidal, and rose-cutting frames are dealt with; interesting though they are, the limit of our space prevents more than a passing notice. We would, however, draw the author's attention to an extremely novel motion in this connexion recently invented by an amateur, Mr. Tighe Hamilton, of Dublin. For want of a better term it may be called a "drunken eccentric" motion, combining both revolving and horizontal traverse motions at the same time. At present it is utilised in cutting fine gear wheels from the solid, to the teeth of which it can give any desired degree of curvature, all sizes, pitches, angles, and tapers being variable at will. With some alterations it could be added to the turning-lathe, and used for dovetailing, and dovetail tongueing and grooving, as well as for various kinds of ornamental work.

The author, in Chapter VII., treats at length on eccentric and oval chucks, and Plate 35 shows two fine specimens of oval surface decoration. Chapter VIII. deals with the spherical and other chucks, and some very useful instructions as to working them will be found. Plate 41 illustrates a good example of a model clock-tower turned in ivory. This is intended by the author to show chiefly the capabilities of the rectilinear chuck, and no portion of the model was touched after leaving the lathe. A full description of the method of working pursued is given, which should be extremely useful to amateurs desirous of carrying out similar work; and this feature, showing what tools are to be employed, is one that could be extended with advantage. The great range of the work that can be performed by the lathe and its various adjuncts is well shown by a large number of illustrations of vases, tazzas, Gothic windows, recessed panels, &c. These two latter, by the way, can be much more rapidly produced on a vertical spindle, irregular moulding, and recessing machine than by a lathe.

In taking our leave of this really admirable book, we cannot help thinking that if some of the language and descriptions given were a little simpler it would be of still greater service to those for whom the book has been designed, viz., amateur turners; in point of fact, to understand it thoroughly, the amateur must really be a somewhat advanced technologist, which we are afraid, in the great majority of cases, he is not.

During a long series of years the lathe has gradually developed, until it has become the most advanced of all mechanical tools; but the author can congratulate himself on having done it ample justice, and on the completion of his next volume will have practically exhausted the subject, and completed a work on the lathe and its manipulation unequalled in any language.

RAILWAY GOODS RATES.

"OWNER'S RISK."

THIS subject, on which we have before offered some observations (see p. 183, *ante*), is one which may be approached from many points of view, but in whatever aspect it is looked upon there are considerable difficulties to be overcome. So uncertain and inconsistent are the regulations that a large amount of patient attention is necessary to comprehend them, and many of them will be found open to various interpretations.

A fruitful source of contention and litigation is furnished by the "Owner's Risk" system, and some information on this point may not be uninteresting, especially to those of our readers who are in the building trade, and to whom the subject must often become one of very practical importance. The rates charged for carriage of different articles vary in proportion to their bulk and value, goods of a damageable nature being highly rated accordingly. In an early stage of railway history it was found to be advantageous both to the Railway Companies and the public to adopt a system whereby the rates for certain easily breakable goods should be reduced on condition that the consignors agreed to relieve the companies from liability in case of damage. The amount allowed off the ordinary rates in such cases varies from 10 per cent. to 20 per cent. Articles rated second class are generally subject to a reduction of 10 per cent. or 15 per cent.; third and fourth class rates are reduced 15 per cent.; and fifth class 20 per cent. Thus, to take a few articles used by the trade as examples:—Carved stone for building purposes (not being for interior decoration) is chargeable at the second class rate, and, when at Owner's Risk, 10 per cent. less. Iron mantel shams, palisades, spoutings and connexions, kitchen and furnace boilers, ranges, grates, and stoves, are second class less 15 per cent. Window glass, joiners' work, marble and enamelled slate slabs (in cases) are rated third class less 15 per cent., and tomb-stones and carved decoration stone fourth class less 15 per cent. The 20 per cent. reduction only applies to such goods as organ work, looking-glasses, and a few other articles included in class five. It may be mentioned that the class rates run in something like the following proportion per ton:—For a distance of about 200 miles,—first, 33s. 4d.; second, 40s.; third, 50s.; fourth, 61s. 8d.; fifth, 75s. There does not, however, appear to be any rule on this point, as the proportion varies considerably between different places. The system of charging just described only came into operation on the 1st of January, 1883, and is therefore comparatively new; and though it was a step in the direction of uniformity, it was found, as a rule, to involve an increase in the owners' risk rates. Previously, the rule (with a few exceptions) was to charge one class lower when at owner's risk than when not so conveyed. It will be seen that the per centage now allowed does not amount to a reduction equal to that caused by adopting the next lowest class rate, and in many cases the proportionate difference between the class rates is much more than in the example given. Thus, though it is satisfactory to find a uniform system adopted, the change amounts to as great a revolution in the charges as did the scale for "smalls" introduced in 1877, which has been treated of in a previous paper. There are special owners' risk rates in force between certain points for exceptional traffic, and heavy traffic not included in the five classes is also subject to special arrangements. In addition to reducing the rates, the companies undertake to return certain goods to the senders to be repaired or replaced free of charge when

conveyed at the owner's risk, and damaged in transit. This arrangement does not apply to all goods which are so conveyed, it being obvious that some of the articles just mentioned are of no value whatever when broken, and that it would be useless to return them. But when the present system of charging was introduced, the railway companies raised a storm about their ears by announcing that they should discontinue the "free returns" altogether. This, as it was well put by one of the trade associations protesting against the alteration, would be putting a premium upon carelessness, as, when it was necessary for an article to be returned for repairs, the carriage upon it would have to be paid three times over; and the companies, recognising the manifest unfairness of their proposal, reverted to the original arrangement in this respect. This regulation also includes free conveyance of the repaired articles, or those sent to replace the broken ones.

The declaration signed by the sender of the goods, though familiar enough to many, may here be quoted:—"The —— Railway Company are requested to receive and forward, as per address and particulars on this note, the undermentioned goods, to be carried at the reduced rate below the Company's ordinary rate, in consideration whereof I undertake to relieve the —— Railway Company and all other companies over whose lines the goods may pass, from all liability in case of damage or delay." Some of the companies add the following:—"Except upon proof that such loss, detention, or injury arose from wilful misconduct on the part of the companies' servants." The omission of this last clause would not affect the right of a trader to sue for compensation in the event of the loss being caused under the circumstances therein mentioned, as the oft-quoted "Cardwell's Act" (Railway and Canal Traffic Act, 1854) affords protection in such cases. That Act provides that every company shall be liable for loss of or injury done to any goods in transit, occasioned by the neglect or default of such company or its servants, notwithstanding any notice limiting such liability. At the same time it is provided that nothing contained in the Act shall be construed to prevent the company from making such conditions as shall be adjudged to be just and reasonable. Now, a contract without the latter clause would scarcely be looked upon as just and reasonable by any court or judge, as the company's servants would thus be protected, even in malicious and wilful damage, and the agreement would therefore be manifestly unjust. The only conclusion that can be arrived at with regard to the omission of the clause by some of the companies is that they rely on getting rid of some demands through the claimants being ignorant of the law, and being thus deterred from prosecuting their claims. Of course there is always a difficulty in bringing home a charge of wilful misconduct, but still it is quite possible for any one unaware of the provisions of the Act of 1854 to abandon a very clear case on being referred to the terms of the contract. Lord Justice Brett says, with his usual clearness, that although there is the alternative rate of carriage, if the exception as to the wilful misconduct does not appear in the document he would hesitate to allow the reasonableness of the contract, his opinion being that the consent of the parties does not make that reasonable and just, which, in the opinion of the court, is unjust and unreasonable. Other authorities have, however, expressed a different opinion, and this clause is an anvil upon which many a case has been hammered, there being numerous precedents to be referred to on both sides in cases of this nature. "Wilful misconduct" has been variously defined, but the exposition given by Lord Justice Cotton is, perhaps, one of the clearest. He says that wilful misconduct is a doing of something which the person doing it knows will cause risk or injury, or the doing of an unusual thing with reference to the matter in hand either in spite of warning or without care, regardless whether it will or will not cause injury. Perhaps this would have been more complete if he had added that it would include the omitting to do something which the party would know it was wrong to omit, being aware that the omission would be likely to result in damage. But this is a nice question, and one to be determined rather by the merits of the case than by legal or general definitions. Certain it is that the same words have been claimed as protecting opposing parties, and different circumstances give the verdict first to one side and then to the other.

NOTES.

IN reference, we presume, to our "Note" of last week in regard to the Liverpool Cathedral site controversy, a printed protest with no names to it has been sent to us, accompanied by a plan of the site with the cathedral and cloisters of Wells laid down upon it, to show the inadequacy of the site. The cloisters stretch beyond the site considerably, though the cathedral plan is purposely drawn away to the west side of the site to emphasise the insufficiency of the ground. Of course if a residential cathedral with a cloister-garth is regarded as a *sine quâ non*, the site is too small; it is too small also, without the cloister and residences, for a processional Mediæval cathedral of the largest type. It seems to be quite forgotten, however, that the cloister had its *raison d'être* as part of a monastic institution, of which the church itself was only a part; and as it may be presumed that the intention is to build a cathedral and not a monastery, the necessity of the cloister is not apparent. As to the cathedral, we have already expressed a hope that some effort would be made to build an essentially modern cathedral for congregational worship, such as Wren would have made St. Paul's had he been allowed. Such a building would naturally be square in general plan, not long; and there is room for a fine building of such a type on the selected site. The clerical party (for we presume the circular emanates from them) have put a Mediæval plan on the site, which is certainly not suitable to it, as if that were the only alternative. We very much hope to see a people's cathedral built, and not a mere Mediæval imitation, which, in such a town as Liverpool, we should regard as little better than a costly anachronism.

THE works of Blake in which his genius appears at his best, the poems written and decorated by himself in his own extraordinary and unique style, have hitherto been known only to the few who possessed copies or who had studied those in the Print Room of the British Museum. *Fac-similes* in colour of some of the pages were given in the appendix to Gilchrist's life and in Mr. Swinburne's book, "William Blake, a Study," but these did not convey the feeling of the hand-painted originals. Mr. Pearson, of Pall Mall, has commenced the publication of a limited number of hand-painted copies of Blake's works, including the "Book of Thel," the "Visions of the Daughters of Albion," "The Songs of Innocence," and "Songs of Experience," the "Europe," the "Los," and the "Milton." Of these, the first two named are complete, and in the hands of subscribers, the issue of each book being confined to fifty copies. These are very remarkable examples of reproduction; and without seeing the originals alongside of the copies, it would be difficult to judge whether they were not original Blake copies, Blake's peculiar colouring and touch being so well imitated. The names of the artists who have worked upon them are not as yet published, but it is stated that there are several hands at work, and that each artist works on some portion of every plate, with a view to the obliteration of mannerism. The "Vision of the Daughters of Albion" exhibits more of the eccentricity and less of the real power of Blake as a designer than many others of his works, and some of the designs display that childish crudity in the drawing of the figure which is one of the most extraordinary characteristics of an artist who unquestionably *could* draw when he was minded to. Not so with that ethereal little work, the "Book of Thel," in which the sketched figures (for they are only sketches) are exquisite in their grace and fancy, and the poem, in Blake's quaint printed writing, reads like some "emanation," as he would have said, from an ideal world quite different from ours. It is something at least that fifty more people can now possess this little gem almost in its original beauty; and one only laments that the conditions of production are necessarily such as to limit the number of copies, and render the price prohibitive except to the few. Perhaps, however, it would not do to make Blake too common. One shudders at the idea of the thumb of the Philistine brushing the bloom off his pages.

PART II. of the Transactions of the Royal Institute of British Architects for 1883-4, which is just out, exemplifies the great and desirable advance made in the employment of illustrations, as well in quantity as in quality. A large proportion of the illustrations are representations of buildings recently erected in India, to accompany Mr. Emerson's paper; some of the Pugin Travelling Studentship drawings are also reproduced; and among more practical illustrations are two pages of constructive details, showing the "precautions to be adopted in introducing the electric light into houses." The Institute volume is now one which may become not only valuable to architects for reference, but of considerable interest to the educated public outside the profession.

THE *Daily News* calls attention to the neglected condition of the oddly-shaped open spaces at Hyde Park Corner which were formed in connexion with the so-called improvement recently effected in that locality, and suggests that they should be put in order pending arrangements being made for adorning these spaces with statuary, which, it appears, is in contemplation. It seems to be the fate of all new metropolitan improvements that the site should remain a blot and disfigurement for a considerable period. The Courts of Justice are no exception to this rule, a large plot of ground on the west side of the new buildings remaining to this day in a disgracefully neglected condition, being covered with all manner of *débris* and old building materials. If the Government cannot make up their mind as to the appropriation of this site, they might at least level it and make its appearance endurable; at present it is a scandal and an eyesore.

CONSIDERABLE weight should attach to the opinion expressed at the Congress of Railway Servants on the subject of automatic brakes. No class of persons are so competent to form an opinion on the value of this appliance as are the engine-drivers; and they appear to be tolerably unanimous in favour of the automatic method. As to the outcome of the discussion on the subject of overtime, the enforcement of a return to "set forth the number of men that are required to resume duty without an interval of rest of less than nine hours," if coupled with a return of any who are engaged for more than nine hours continuously, or with brief intervals for food, might not only tend greatly to the reduction of accidents to railway servants, but would also give satisfaction to the public. It is not easy to over-estimate the importance of any regulations affecting the safety of our great railway army, which contains some 368,000 men. Out of these, about 17 per cent. are directly concerned in working the traffic. It is on that small number, therefore, that the heavy per-centage of injuries to the servants of the companies has principally to be reckoned,—a fact which imparts irresistible force to the demand for a system of couplings which would avoid the necessity of the workmen going between the vehicles.

WE have received from Mr. Chas. Barry a copy of his Report on the designs sent in for the proposed new building for the Lincoln School of Science and Art, in reference to which he has been acting as professional adviser. As we stated a fortnight ago (p. 473), he has recommended, as the best three, the designs marked respectively "For ever," "Study," and "Academia." The

Report touches on some matters of general principle in regard to competitions. The treatment of the site has been of every variety, some competitors building over the whole of it, while others utilise only a part, while all equally declare their confidence in being able to carry out their building for the limited sum named in the instructions. Calculations convinced Mr. Barry that some of them would cost double the stipulated amount, and many would be considerably in excess of it. He therefore rightly decided to deal only with the best of those which could be executed for something like the maximum amount allowed in the instructions (7,150*l.*), and concludes his Report with these very pertinent remarks, which deserve to be duly weighed by Competion Committees generally:—

"I hope I may urge on the committee, on behalf of the profession to which I and the competitors have the honour to belong, that the object architects have in view in entering into a competition such as this is not the obtaining a premium (however well deserved that generally is for the labour in making a design), but the honour and professional credit of being allowed to carry out their design into execution. I do not doubt the committee are fully aware of this, and unless some serious reason should be found to exist to the contrary, that the authors of the three designs I have selected will, in the order named (subject to the verification of estimate), be deemed to have the first claim on their regard.

I trust the committee will not think it presumptuous on my part to make the above remarks, which I am sensible are beyond the strict duty laid upon me, viz., to select the three best designs, and those which were also found to be most in accordance with the conditions issued to competitors.

The committee will understand from what I have said that there are designs among those sent in of superior merit to those I have named, some as regards larger accommodation, convenience, and good arrangement, and some as regards design, and I regret that I do not feel at liberty to make my selection on the ground of merit only, irrespective of cost."

THE Architectural Association *conversazione*, at the Prince's Hall, on Friday last, was a considerable improvement upon that of last year. The number of invitations was restricted to the capability of the rooms, and the cloak-room arrangements were upon a more liberal scale than formerly, but in this last particular the accommodation still left much to be desired. The exhibits were of the usual miscellaneous character, wall-papers and carpets predominating; Messrs. Morris & Co.'s contribution was the most important, and included a small tapestry hanging of "The Goose Girl," from a design by Walter Crane; a very gorgeous wall-paper designed for the Waterloo Chamber at Apsley House; and some very handsome specimens of window curtains. Mr. R. Phené Spiers contributed some water-colour sketches in his usual effective style, and there were a large number of drawings by students of the Association classes. The sketches by Mr. Oakeshott, which obtained the Architectural Association travelling studentship, were deservedly admired. Some of these we published some little time since.

THE letter of an American landlord (or rather house-proprietor) which has appeared in a daily contemporary would seem to show that the woes of the tenant are absolutely unknown "in an important city" across the Atlantic. The name of this elysium is suppressed,—perhaps for fear of overcrowding,—but in it, we are assured, the tenant has discharged every obligation when he has paid his rent, while the landlord's responsibilities are almost incalculable. "I am obliged," he says, "to make all repairs, to keep the drains, hot and cold water pipes, furnaces, range,—in fact, *everything in the house*, in perfect order, and to do this at any time I may be called upon by the tenant. In fact, I am compelled to maintain everything connected with the house in first-rate condition." We presume the rents are high enough to cover this indefinite expenditure, and are punctually paid; otherwise the position of landlord must be one which only a philanthropist with a full purse would care to occupy. But, be this as it may, we certainly have here what, from a tenant's point of view, is a very enviable condition of things. The writer goes on to hint that legislation could and should bring it to pass in England also. We have frequently said that a tenant who desires to improve the sanitary state of a house should have a legal right to call on the landlord to contribute to permanent improvements of this kind. But *quid leges sine moribus?* The best sanitary system may be, and often is, rendered useless by the culpable carelessness of the very people in whose interest it has been devised. Without general education on the one part and special knowledge on the other, the mere addition of new laws to the Statute Book will be quite unavailing.

THE Junior Carlton Club, Pall-mall, is about to be enlarged by the addition of the site of Adair House, at the corner of George-street, which adjoins the club on the west side. A new reading-room, with a handsome library on the first floor, and a billiard-room over, will be formed on the site of Adair House; the principal staircase will be reconstructed, the present smoking-room enlarged, a new strangers' smoking-room provided, and considerable improvements made on the ground-floor of the building. An open portico will be formed in the centre of the front next Pall Mall, and new bay windows thrown out in the east and west wings. The architect is Mr. J. Macvicar Anderson.

THE Metropolitan Board of Works are about to reconstruct Hammersmith Bridge. at a cost of 82,000*l.*, including the provision of a temporary bridge. The design of the present bridge is simple and appropriate, but the Board appear to be dissatisfied with it, and propose to convert the plain massive stone towers carrying the chains into Chinese pagodas modelled apparently upon those at Albert Bridge, Battersea.

THE completion of the Inner Circle Railway has proved for the present to be a curse rather than a blessing. The state of things on the lines converging from Hammersmith, Putney, and other out-districts, to Earl's-court Junction, is simply intolerable, the greater part of the journey being occupied in blocks, not only at the station, but at intermediate points. Business men who travel by the Underground Railway will not stand this for long, the companies may be assured; and they had better recognise at once the fact that in trying to crowd too much on their lines they have simply choked the traffic, and must reduce it at once to such a number of trains as can really be worked, unless they want people to take to cabs and omnibuses again, as the faster method of locomotion.

A PUBLIC meeting is announced to be held at Woolwich on Wednesday the 22nd, under the presidency of Lord Forbes, when resolutions will be proposed "condemning the disgraceful state of the Thames, and pointing out proper remedies." The railway companies and the Lower Thames watering places (Margate, Ramsgate, &c.) appear to be among the interests specially represented at the meeting.

WE have received from Mr. Stayton, the surveyor to the parish of Chelsea, a copy of his special report to the Chelsea Vestry on the system of electric lighting as in use at Colchester. He says,—"The area supplied is in the centre of the borough, and comprises Head-street, High-street, and Culver-street. The generating station is in a yard in the latter street, the engine for driving the two 40-light brush dynamo-machines being of 25-h.p. nominal. I saw the machinery in full operation, and feel bound to add that there was no apparent cause of annoyance, and that similar stations might be established in any part of a town without creating inconvenience. The current is conveyed to six storage stations, five of which are ordinary cellars underneath street shops, and in which the necessary number of accumulators or secondary batteries are placed. The cables are carried underneath the footways in a brick trench, 9 in. by 7½ in., suitably arranged for drainage. The cables and service wires are all suitably insulated by lead coatings, and the service connexions to the houses are laid in wooden troughs under the footways." Only about thirty premises are at present supplied with the light, and at present it is not and cannot be a commercial success, but "the practicability of house to house lighting has been successfully demonstrated."

THE Fulham District Board of Works have printed a copy of a letter addressed to the Home Office, in reference to a case in which they had been accused of unnecessarily prosecuting costermongers and others for creating obstruction in King-street, West Hammersmith, by the establishment of fifty to sixty barrows or trucks remaining stationary in the roads for many hours, the barrows forming a continuous line, and the sales carried on causing crowds in the streets and greatly impeding the vehicular traffic. We are only in possession of the Board's statement, but on that we should be disposed to support them in their crusade. In connexion with the subject we may advert to the nuisance which has been occasioned during the whole time of the Health Exhibition by the crowd of low hawkers standing in a row on the curb, from the corner of Cromwell-road onwards, and making the locality hideous with their discordant cries. We do not believe there is any large city in England, except London, where such a nuisance would be tolerated, or where visitors to an important exhibition would be obliged, as it were, to run the gauntlet of a set of howling vagabonds each trying to shout louder than the other the recommendation of his particular gim-cracks.

THE KIND OF ARCHITECT WHO CANNOT GET ON.

His father was the vicar of a small country parish, and, the church requiring restoring, he thought it a good opportunity to make terms with the eminent architect who conducted that nowadays thankless operation for the professional education of the subject of our sketch. The anxious father was moved thereto by several considerations. First of all, young hopeful had missed the scholarship which was to have smoothed the way to a University career and had disconcerted all the family plans thereby; and, secondly, the good Vicar was taken aback at the, to his thinking, ample remuneration which the fashionable architect received for a few slight drawings and a casual visit or two,—an amount which contrasted sharply with the very moderate stipend which rewarded his own ministrations. He was, moreover, dazzled by the long list of similar commissions which the professional gentleman had on hand, and upon which he expatiated with off-hand volubility. And so the preliminaries were discussed and settled, the premium paid (not without a pang), and the young man, duly articled for three years, left his country home for the office of the great London architect, carrying with him the hopes and fears of his impoverished parents. He was not badly equipped for the profession selected for him. He had received a fair education at the local Grammar School. His breeding and his home life in an English parsonage had given him the manners and bearing of a gentleman, and his father's position might reasonably be counted upon for an introduction to the superior clergy and the county families.

His reception in the office of the master of the building arts was not quite what he expected. In the first place, his Principal was rarely seen. The important commissions he had on hand, and the still more important ones he had in view, kept that accomplished artist running about the country a good deal. His office business was conducted by one scantily-remunerated, but trusty, clerk, of tried fidelity, skill and experience, and of untiring industry, assisted by a number of pupils, who did as little and absented themselves as much as possible. The new pupil was taught nothing. He picked up the simple but showy art of tracing, and he copied specifications. In response to the importunate clamours of sundry clerks of works, he adapted to new circumstances some stock details which had done similar duty on several occasions, and he compiled some wonderful specifications by a process of selection from a store of originals. In neither of these occupations did he take any real interest, nor did either of them afford any suitable opportunities for his advancement. The *rationale* of the art

he was supposed to be acquiring was never explained to him, and he knew but little at the end of his three years' apprenticeship that he did not know at its commencement. The excellent aids to study which the ingenuous youth of the present day has at command did not then exist, and if they had existed our friend had not the energy to avail himself of them. When the day of his emancipation arrived, which his friends certainly thought would have brought with it a secure and honourable position in his employer's office, or a crop of cathedrals to restore, or churches and parsonages to build, they were surprised to learn that there was no longer room for him in the office. He was "pushed from his stool" by a newer crop of pupils, who were about to pass through the same course of "study." In this predicament he tried various devices. He failed to find an entrance to the offices of other architects. His friends with one accord recommended him to "set up for himself," to "start upon his own account." To their innocent minds this seemed like securing fortune by a sort of *coup-de-main*.

He took a dingy office in the Adelphi, very high and airy, and he added his name to the long list on the doorposts, garnished with his professional titles. And he soon discovered that "setting up" and "starting" were not quite the same thing. He did not "start," but "stagnate." It was very dull, sitting alone in that dingy apartment waiting for the clients who never came; and soon those little leaflets which grow on many an office-door began to show themselves, bearing dates which could not be reconciled with the confident statements as to the imminent return of the tenant. The young gentleman was meanwhile consorting with other young gentlemen similarly conditioned who railed on Lady Fortune in set terms, and could not for the life of them make out how it was that the Scotts, and Streets, and Waterhouses of the period got all the work. This state of things was brought to a sudden close. The youth returned to his ancestral home, whence he was driven by the death of his father, and the consequent disruption of his home. A compassionate friend found him office room and a pound a week,—as a temporary measure. This asylum failed him after a short time, and then his path in life led undeviatingly downwards. He had no qualifications for the battle of life. He was not even a draughtsman in any sense of the word, and could not subsist on that "charing" which has found for so many young men the bridge from clerkship to independent practice.

That "able assistance" which is so very easy to obtain,—*vide* advertisements,—was not his to give. Pen-and-ink perspectives of the effective sort he could in no wise prepare. The designs which he once undertook to furnish "from the rough sketches" of a distant and deluded employer were returned to him with a scornful letter rougher than the sketches. Of all practical knowledge he was quite innocent. "Quantities" had always been so repugnant to him that he never fully understood the meaning of the word, and was certainly unacquainted with the operations involved in their preparation. He could not have written an intelligible specification to save his life, and to price or criticise a builder's account was not to be thought of. He could trace what was drawn for him and copy what was written, and these he could do but "indifferent well." There is but a limited demand for such arts as these, and the remuneration they command is but trifling. And thus it came to pass that he fell into disgrace and poverty, and kept out of the way of those friends whose patience and purses he had long since exhausted.

There are but few architects in town who have not recently suffered a call from one or another of the numerous specimens of this class. The type varies but little, and one portrait will serve for the whole. He has no card, but sends in a name; a very good one, of course. The office-boy delivers it with mysterious reserve, but cannot enter upon explanations in the hearing of the caller, who is close upon his heels. The embarrassment he manifests is variously interpreted by his master. It may mean another vicarious application for that little account, and the professional gentleman is perturbed at the thought and at the impossibility of retreat. Offices are generally so badly planned. Or it may be a new client. Hope springs eternal in the human breast, and this delusive suggestion gains a decisive victory. The stranger is admitted, and his whole story is read at a glance. It is an oft-told tale. His costume is mainly noticeable for new and ingenious adjustments. His bearing is either offensively servile, and his address a whine, or he puts on the easy swagger of a familiar friend. Has Mr. Blank a vacancy in his office? Unfortunately, no. Things are flat. It is found by the visitor to be so in other quarters. Even the great Mr. Friba cannot offer him employment. Will Mr. Blank kindly look at a few drawings? At this juncture Mr. Blank suddenly recollects a very important engagement. But his retreat is cut off, and before he can escape the dirty package is untied, and some dirtier drawings displayed. Poor things enough! Designs for a country school, or something of the kind, culminating in a pen-and-ink perspective ludicrously out of drawing, with inhuman figures more preposterously ill-drawn still. A short lecture is delivered thereon with the volubility of frequent repetition. It appears that they were submitted in competition; but "of course a local man got the job," &c.

The conversation, or rather monologue, takes a sudden turn in the direction of certain irregularities in the matter of daily meals: of the absence of breakfast on that particular morning,—on many previous mornings, and finally settles down upon the immense relief which would follow the temporary,—merely temporary,—advance of half a crown. Sometimes the appearance of the applicant is a sure indication of the real cause of his misfortunes. In the saddest cases ability is not wanting,—only the ability to keep away from the establishment at the corner. And there are cases where the failure to keep a footing in the crush and crowd of modern life is not culpable. As the American Æsop wisely says in his modern version of the fable of the Tortoise and the Hare, "The race is not *always* to the slow." We have exact information as to at least one instance in which merit is but inadequately rewarded. Nevertheless a specialist can always get a living of some sort,—an artist will always find a market for art, a practical man can at least find employment as a clerk of works. If luxury cannot be attained, no one able and willing to work need despair of modest comfort. But woe to those who fail to qualify for some branch of the great profession which they adopt. As the world is more and more the individual certainly becomes less and less. He drops out of the crowd and is lost sight of. As the years go by the descent into Avernus becomes increasingly easy, and it is now more than ever necessary for those to bestir themselves who are ambitious even to keep their foot-hold; doubly so for those who would "get on."

WHO IS A WORKMAN?

It is noticeable that, though well nigh ten years have elapsed since the passing of the Employers and Workmen Act, 1875, there has been very little litigation on the meaning of the term "workman." This shows, at any rate, that the explanation of that word in this Act has been comprehensive and clear enough to prevent disputes from arising. It is perhaps more important therefore to take careful note of judicial views which help to explain or to affect this statute, and some recent decisions enable those interested in the subject to obtain further light on the meaning of the word in question. Section 10 of the Act of 1875 defines a workman as not a domestic or menial servant, but, with this exception, to include any person who, being a labourer, servant in husbandry, journeyman, artificer, handicraftsman, miner, or otherwise engaged in manual labour, whether under the age of twenty-one years or above that age, has entered into or works under a contract with an employer, whether the contract be made before or after the passing of this Act, be express or implied, oral or in writing, and be a contract of service or a contract to execute any work or labour." It will be remembered that this section has, in recent years, become of greater importance, because the Employers' Liability Act of 1880 defines a workman to mean "a railway servant and any other person to whom the Employers and Workmen Act, 1875, applies." Until quite recently, as we have said, there has been little judicial discussion of the clause in the Act of 1875, but quite at the end of last year the Queen's Bench Division decided that an omnibus conductor was not within the meaning of the section. In so deciding they differed from the Court of Session in Scotland, who held in an earlier case exactly the opposite. Where judges disagree it would not be for us to step in. Nor is the question whether an omnibus conductor is within the statute of direct importance to readers of this journal. It is interesting and important, however, from the fact that it shows a judicial tendency to lessen the meaning of the words "engaged in manual labour," for, said Mr. Justice Smith, "the mere fact that a workman works with his hands is not enough to constitute him a workman within the section." A case, however, has just been reported (Jackson *v.* Hill & Co., Law Reports 12, Q. B. D., p. 618) which directly affects all enterprising manufacturers, and many others besides. A mechanic had been engaged by a firm "to assist as a practical working mechanic in developing ideas the firm wished to carry out, and in himself originating and carrying out ideas and inventions suitable to the business of the firm." This person worked by himself in a separate room, but disputes having arisen between him and his employers he was put to work in "the shop" as an ordinary practical mechanic. Very naturally this was resented, and the mechanic absented himself from the place, and was therefore summoned for unduly absenting himself from his work without lawful cause. The stipendiary magistrate held that he was a workman within the Act of 1875, and he thereupon appealed to the High Court. This tribunal considered that a person engaged as was this mechanic, not as an ordinary practical working mechanic, did not fall within the meaning of the words in the Act, and they reversed the decision of the magistrate. Yet, though the person was superior to the ordinary mechanic, it is clear that the gist of his employment was that he should, as a working mechanic, develope the ideas of those who were not skilled in manual labour, and certainly one would have called him a handicraftsman or a person engaged in manual labour. It may, perhaps, be said that this man was somewhat like a sculptor, who works with brains and hands; but it appears to us that whereas the sculptor is primarily a brain-worker, this man was primarily a hand-worker. We have said enough, however to show the effect and the importance of this decision without further criticising a judicial opinion.

THE DUTIES AND QUALIFICATIONS OF TOWN SURVEYORS.

THE EXAMINATION QUESTION.

In the course of the discussion which took place at the meeting of the Association of Municipal and Sanitary Engineers and Surveyors at the Health Exhibition, mentioned in another column,

Captain Douglas Galton said it was absolutely necessary that those who undertook the duties of surveyors of towns, or those of sanitary inspectors, should be qualified for their work. The Sanitary Institute, recognising this, had led the way in the matter by initiating examinations. A medical officer was not appointed unless he had obtained some diploma which certified that he was thoroughly competent; and, similarly, a diploma should be required from surveyors and sanitary inspectors before they undertook work which so eminently concerned the health of the community. He did not say that the Sanitary Institute was the best body for the purpose, but he did contend that some examination should be required, and a diploma obtained from one of the many colleges and universities which were now spread all over the country. But, on the other hand, having obtained an appointment under such conditions, it was equally necessary that some protection should be afforded the surveyor or inspector in his office, so that he should not be liable to be turned away after four or five years by the Board whom he was serving, without some power of appeal to a central authority, such as the Local Government Board. He hoped the hon. chairman (Sir Charles Dilke), as President of the Local Government Board, would consider these points.

Mr. E. Chadwick, C.B., advocated larger and more extended areas of local government, as calculated to secure the employment of better-qualified and more experienced officers, especially where towns had large and populous suburbs outside the borough boundaries. Qualified service was cheap service, and sanitary

officers should have their qualifications tested by the central authority. The economy to be dealt with by sanitation was a burden three times greater than the burden of the poor-rates, and the eradication of that burden by skill and responsibility was the greatest of all economies. There was no economy equal to the prevention of preventible sickness and mortality. They had proved that mortality was preventible by sanitation in towns where the death-rate had been reduced by one half or a third. He hoped this would be extended by legislation, in which he trusted the chairman would take an active part in the housing of the poor, and the removal of the slums.

Mr. Ellice-Clark expressed his opinion that a Minister of Health should be appointed, whose sole attention should be devoted to sanitary questions. Alluding to the observations of Captain Galton on the subject of examinations, although he would rather that the discussion should not take the form of a dispute between the Sanitary Institute of Great Britain and the Association of Municipal Engineers, he certainly thought its dignity had been somewhat compromised by the attitude taken up by the Institute in regard to the examination of surveyors. The Sanitary Institute had a field before it to enforce sanitary ideas, and he thought it might have left the examination of local surveyors to the Municipal Association. True, the Sanitary Institute was the first to think of the examination of local civil engineers, but it was within the experience of borough surveyors that assistants who had passed high examinations upon paper had proved altogether incompetent when put practically to the test. Then as to all local surveyors having a diploma. What kind of a diploma could they expect that man to have who was offered a salary of 120*l.* a year? Why, the idea sank into ridicule. The important borough of Northampton was actually advertising for a borough surveyor at a salary of 200*l.* a year! Two hundred pounds a year! Why, he was himself now carrying out a small work where the clerk of the works was in receipt of four and a half guineas per week. Again, reference had been made to some local authorities grudgingly allowing the wages of a boy to aid the surveyor; and he could bear this out, for when he was acting as the Borough Engineer at Derby, it was actually the subject of division whether an assistant should receive 12s. a week or 80*l.* a year! No doubt the existing staffs were in many cases inefficient. In all towns fees should be chargeable upon the owners for superintending the erection of new buildings, as was the case at West Ham. It was quite impossible, under present arrangements, for the local surveyor to see that even the rudiments of a building were properly carried out; and although there was a great objection to the demanding of fees, yet he believed that was the only solution of the difficulty. Next he came to the question of protection, which was necessarily a delicate one. The spirit of the age was to extend local government, and if they were now to deprive the local authorities of the power to dismiss their officers, they would be curtailing, rather than extending, the functions of such authorities. At the present time, however, he said emphatically that it was perfectly impossible for the majority of local surveyors to do their duty in such a manner as the Local Government Board would approve were they acquainted with all the circumstances of the case. It often happened that those sitting on committees were interested in the subject under consideration. Although he had an exceptionally good Board, he could bring forward one little case which would prove this up to the hilt. Within a few years he had had to summon six builders for using bad mortar, when there absolutely went into the witness-box two members of the Board to say that the mortar was good! And one of these very gentlemen was sitting on the Works Committee when the prosecution was ordered; while both, six months later, had to sit in committee on the question of the increase of his salary. In the mortar case, several analyses had to be obtained before the magistrates could arrive at the conclusion that the "muck" of which he complained was not mortar! He suggested that such cases should be tried by some special tribunal instead of by the local magistrates, and in conclusion said he hoped Sir Charles Dilke, by giving his attention to the several points that had been raised, might be able to devise some means for practically aiding the local surveyors in more effectually carrying out the duties which devolved upon them under the provisions of the Public Health Act.

Mr. Jones (Ealing) spoke in favour of fees for proper inspection of new buildings being made universal and compulsory. This would enable a Local Board to employ an adequate staff of competent men to supervise the erection of buildings. He felt they were right in pressing this point upon the President of the Local Government Board. He also urged that there should be power given to compel the drains to be laid at the commencement of a building, and to prevent them being covered up until they had been properly inspected. He held, too, that when a surveyor had been articled to a person of repute, had served his time, and had had practical experience, he held a position beyond what could be given by a certificate by the Sanitary Institute, without any disrespect to the latter body. As to protection to surveyors, he thought there was a great deal of truth in the remark of Mr. Robinson, that when a surveyor and his Board quarrelled, the sooner they parted the better. If an officer retained his position under the protection of the Local Government Board, he would not find his life a very happy one.

Sir Charles Dilke said he thought this would be a convenient time for him to offer the few remarks which he proposed to address to them. In the first place, he was glad to have the opportunity of meeting a representative assembly of the surveyors throughout England, and of saying that in the discharge of the duties which had been thrown upon him, not only in his capacity of President of the Local Government Board, but also as the Chairman of the Royal Commission on the Housing of the Working Classes, he found that the greater sanitary evils still existing throughout the country, were not mainly in those departments which came under the control of the surveyors. He thought the exceptions which still existed to the enormous general improvement which has taken place in sanitary science and public health were attributable to sources which did not come very directly within the province of the surveyors. Generally speaking, he was disposed to think that an enormous advance had been made in regard to those matters with which the surveyors would have been most concerned. There could be no doubt that there had been a great diminution of mortality in the country; and although this diminution had been general, there was no doubt that England compared to advantage with other countries; and for this result there was no man to whom more credit was due than to Mr. Edwin Chadwick. The exceptions to the general advance which he had come across were to be found in rural districts, which were not within the control of any urban sanitary district,—localities lying within the jurisdiction of boards of guardians not possessing urban sanitary powers. In the metropolis, too, there were numerous sanitary evils still in existence. Not only was there a good deal of conflict of local authority, but there was constantly going on an enormous creation of population. Hence the state of things in London was no fair test of what exists in the country generally. The surveyor's work in the metropolis was different from the work of the local surveyors in the country; for in London the work which in boroughs was done by the local surveyors fell partly on the Metropolitan Board of Works and partly on the vestries. There were, in fact, no fewer than thirty-nine different authorities concerned in the metropolis; and he was bound to say, while he wished to avoid controversial topics, that he felt it would be impossible to get rid of the evils which still existed without some further concentration or unification of authority. As regarded rural districts, he thought they would still find, in some places, that people were drinking water drawn from small ponds into which the drainage of rows of cottages passed. He had found this to be the case at Marston-green, Birmingham, in Essex, in Surrey, and in the West of England. He had not, however, found this state of things to exist in urban sanitary districts, and he believed the instances were now exceedingly rare. There had been some great exceptions to the general improvement in the health of the country. There had been painful epidemics at Kidderminster and at Beverley, and an outbreak of typhoid and small-pox at Liverpool. He did not, however, think that any of these cases were traceable to causes within the control of the local surveyors. He thought they arose out of other people's business than more directly theirs. The condition of the River Thames, of the River Lee, and of the Cam at Cambridge, were all questions which might occupy the attention of the surveyors of the country. He was inclined to greatly congratulate that body upon the work of the past, and he repeated that he had very little fault to find with those matters which came within their care. Passing from general considerations to details, he found there had been complaints that, upon Local Boards, there were persons interested against sanitary reforms; and that this element constituted an immense difficulty in the way of the surveyors, as also, of course, of the medical officers. This was no new charge. He had himself made it matter for comment in Parliament, and the charge was one which could be substantiated by an immense amount of information every day. Now, how could this be got over? It had been suggested that the Local Government Board should take steps to remedy the evil complained of. At present, when matters came under the notice of the Board, suggestions were at once forwarded by letter in small cases; and in other cases, where the public health was likely to be seriously affected, an inspector was sent down to hold a local inquiry. But, as regards doing the work or becoming responsible to the public for its performance, there were enormous difficulties in the way. He did not think any Government department could be made sufficiently large,—he did not think they could have a sufficiently enormous staff,—to perform the duties which would, in such case, be thrown upon it. At present there existed power for the Local Government Board to declare an authority in default, and to step in and do the work; but this power had never yet been acted upon, and he did not think, unless in a case of very great emergency, where the public health might be jeopardised to a very great degree, it was ever likely to be acted upon. Next, he came to the question of the examination of local surveyors. This was a matter which had been brought very prominently before the Royal Commission of which he spoke just now. They had had examinations suggested, and they had on the Commission Mr. George Godwin, who had very strong opinions upon that point. He (Sir Charles) must not anticipate what the nature of the report of the Commission would be, but he might go so far as to say that he thought it probable some allusion would be made to the question of examinations, and that possibly some observations might also be made on the subject. Mr. Ellice-Clark, in the admirable remarks he made, had summed up very concisely the arguments upon what the Association called the question of protection. Nothing could have been better than the way in which he had stated the case. The reader of the first paper had referred to the case of Poor Law officers, and had shown that they already possessed that protection, which meant, supporting a man in his appointment against the wishes of the local authority who appointed him. If such were very generally the case, he (Sir Charles) thought the local authority would manage to make the position such that the official would find it impossible to hold it. Therefore he did not think that arrangement would be desirable, or that the Local Government Board should interfere, except, perhaps, in the case of a very near division and a close minority. Generally speaking, and judging from what he knew of the feeling throughout the country, he did not think, whether the Government in power was Liberal or Conservative, that anything like increased central control would be given to any department. He had, however, considered the expediency of there being some representative county authority which might be constituted a court of appeal from the smaller local authorities. In conclusion, he should like to allude to one or two other points upon which it might be desirable that legislation should take place. He had no doubt that the Royal Commission to which he had alluded would recommend legislation upon various matters, but he did not anticipate that they would recommend any violent or sweeping changes. The recommendations would more likely be in the direction of the enforcement of existing legislation than in the extension of it. Formerly Governments had more power for legislation than individual members; but now things were changed, and many Bills were opposed and stopped simply because they were

the measures of the Government. He therefore advised the Association not to look to interference from the Government on the matters which had been brought under consideration, but to see whether they could not get some private members to take up matters on their behalf.

Mr. W. H. White (Oxford) spoke of the difficulty of getting satisfactory by-laws adopted where the sanitary authority was distinct from the corporation, and where the latter owned a quantity of old property, crowded upon a small space, which could not be rebuilt in the same way if proper by-laws were in force. He suggested that, in such exceptional cases, the Local Government Board should not be so strict in insisting upon the adoption of their Model By-laws, but should approve of the best code that could be carried. He objected altogether to the suggestion of Professor Robinson, that the Local Government Board should act promptly on the complaint of individual ratepayers. There was far too much of this at present, and there was often a great deal of troublesome correspondence about trifles that could readily be explained. He expressed strong doubts as to the value of any certificate of examination, and said he had had several men in his office who had passed such examinations very satisfactorily, and he was not far wide of the mark when he said that the men who had come out the best in examinations were of the least use in the office. He should like to see the surveyor strengthened, as his position was frequently a most difficult one; but he held that the only true and permanent remedy was to educate the constituencies by whom local authorities were elected. Until they were sufficiently educated to elect men solely because they were well fitted to look after the public health, he feared they should not get efficient sanitary work done.

Mr. Lemon (Southampton) said the conflict between local and district surveyors must be got rid of, because the result was that the supervision over buildings was very inefficient. He suggested that the payment of fees should be to the local vestry direct, instead of to the district surveyor, and that from the fees the latter should be paid a salary, and men to exercise proper supervision should also be provided. He believed the principle of allowing Boards of Guardians to act as sanitary authorities was altogether unsound, as they practically neglected the business. If, as Mr. Chadwick had suggested, the sanitary areas were enlarged, many difficulties would be got rid of, and more efficient officers would in many instances be employed. He also condemned the practice of paying heavy compensation for old ruinous property, and endorsed the suggestion that the landlord should not be allowed to receive rent for property that was in an unsanitary condition.

Mr. Pritchard (Birmingham) said the consensus of opinion, both on the part of the readers of the papers and those who had joined in the discussion, was that local government was in some respects defective. He believed the questions of the qualifications and the protection of officers would be settled by increasing the area of districts, and the formation of county boards as had been shadowed forth. Having spoken of the satisfactory way in which the rural sanitary authorities of Solihull and Aston discharged their duties, Mr. Pritchard briefly referred to the epidemic of typhoid at Kidderminster, and to the "slums" which exist there, and concluded by again expressing his preference for enlarged sanitary areas and county boards.

Mr. Jerram (Walthamstow) and Mr. Gamble (Grantham) having spoken,

Mr. Fowler (Manchester) said the difficulty he felt with respect to examination was that experienced by practical old George Stephenson, —"Who is to examine me?" He sharply censured the practice of the "popular" members of local governing bodies, who, for the sake of apparent economy, sacrificed efficiency.

Mr. Angell and the readers of the other papers then replied, and the meeting closed with votes of thanks to Sir Charles Dilke for taking the chair, and to the gentlemen who had read papers.

The Sanitary Congress at Dublin.—The paper on House Drainage in connexion with town sewers was read by Mr. Geo. B. Nichols, of Birmingham, not "J. B. Nicholls."

SHALL PARIS HAVE HER SOUTH KENSINGTON MUSEUM?

This was the question which seemed to meet with something like a solution on Thursday, the 9th, at a banquet given by the "Union Céramique et Chaufournière" to M. Jules Ferry and to M. Antonin Proust, who is president of the "Union Centrale des Arts Décoratifs," to the members of the Jury of the Exhibition at present open at the Palais des Champs-Élysées, and to the press. But we may as well touch on the day's history,—the conference before the banquet.

At two on the same day, then, M. Baudot, member of the Commission des Monuments Historiques and Inspecteur-Général des Édifices Diocésains, delivered, in one of the halls of the Exhibition (the one decorated with the Gobelins tapestries) a lecture "On the Employment of Polychromatic Materials in Construction, and on Ceramic Work in general." M. Baudot has employed ceramic work largely in the new Lycée now rising in the outskirts of Paris, of which he is the architect; and as the completing architect for the restoration of the Château de Blois, commenced by the late M. Duban (see *Builder*, June 28th, p. 942), and the favourite pupil of Viollet-le-Duc, to whom he owes his official position, M. Baudot has every qualification for speaking with authority on so important a subject. He addressed a numerous audience, where by the side of Government architects and members of the "Société Centrale" were crowded the manufacturers of the "Union Céramique" and members of the Académie des Beaux Arts, including MM. Ballu and Garnier, architects, M. Guillaume, sculptor, M. Lauth, director of the manufactory at Sèvres, M. Lameire, the brilliant decorative painter, M. Didron, artist in stained glass, and others. The paper, of three-quarters of an hour long, read by M. Baudot, did not, however, speak very well of the progress of ceramic art in France. Certain veiled sarcasms against his professional brethren who employed too much stone in their buildings or who did not make sufficient effort to harmonise the various materials they used; certain not very definite bits of advice to those more sober and serious minded ones who looked for the decoration of the buildings to ceramic art alone; a very warm eulogium of the Union Céramique et Chaufournière, from the point of view at once of industrial and social, we might almost add of national, advancement, — such are the main points of the address which remain in our memory. Two special recommendations may, however, be mentioned: one was, the necessity of raising a *tarif* on foreign ceramics imported into France, in order to provide a better market for French work (a very questionable principle, M. Baudot); and the second was a special eulogy of Viollet-le-Duc, to whom was due a considerable portion at least of whatever progress had been made in ceramic art in France, through his researches and practical experimenting in the judicious emplogment of these materials.

M. Baudot also put a question in regard to his eminent master, to which we feel moved to suggest an answer. How was it, he asked,—though it was true that no one is a prophet in his own country, — how was it that the work of Viollet-le-Duc was so much more appreciated in foreign countries than in his own? Without calling to mind here how, by the side of his admirable work of restoration, Violliet-le-Duc has too often crowded against the magnificent cathedrals of France little parasitic modern-thirteenth-century edifices which harmonise ill with the old work, one may find an easy answer to the question. For two centuries, as Mr. W. H. White has well shown in his interesting work on "Architecture and Public Buildings," France has possessed a vast network of institutions, inwound one with another, under the comprehensive title of "Académie d'Architecture," or "Académie des Beaux-Arts," "École des Beaux-Arts," "Académie de France à Rome," "Conseil-Général des Bâtiments Civils," and "Inspections Générales" of all branches of architecture; and they have maintained as a special and fundamental law of being, that all, or nearly all, official architects should have a competent knowledge of the art of Greece and Rome, and even of Egypt; while in other countries, in England especially, architectural education has been exceedingly unshackled, and hence the tendency to regard Mediæval architecture, much more than in France, as the specially national architecture; and this tendency has given a special value to the works of Viollet-le-Duc, in which are laid down, with the authority derived from thorough knowledge, the principles, the elements, and the manner of development of the "architecture ogivale" and the arts which cluster round it, as well as the varied resources which it offers to the artist.

Some hours afterwards, many of those who had listened with interest and applause to this lecture, found themselves at the aforesaid banquet, and drawn together by a subject of great interest, for the "Union Céramique et Chaufournière" was really a pretext for putting the great question, — the vital question for French art-industry; the presence of the President of the Council (M. Ferry) furnishing an opportunity for asking once more for the institution of a "Musée des Arts Décoratifs" on a large scale, as the centre for instruction in the industrial arts. M. Proust, the spirited president of the Union Centrale, has pursued this object perseveringly for several years, and on this occasion terminated his speech by demanding, amid the applause of the company, the use of the ancient Palais du Conseil d'État for exhibitions, partly permanent, partly annual, of decorative art.

We believe that M. Ferry, though his official responsibility did not allow him to accede to such a request on the instant or in a formal manner, has promised more or less officially to the Senior Minister of Arts, who is appointed Commissary-General for the Exhibition of 1889, to give fair play to the proposition, and that, having remarked that "we must re-establish the system of apprenticeship, that admirable institution of our forefathers," he was understood to say that he would do all in his power to facilitate the creation of a museum where the production of future masters in the industrial arts would be preserved. It is to be hoped the movement may prosper, for all, French or foreigners, will be the gainers by such an enterprise; but the palace on the Quai d'Orsay, enclosed by streets which limit it in every direction, could hardly become other than a museum for the fashionable quarter, and seems ill adapted for the installation of a great school of industrial arts, decorative and other. But it is, at all events, a question to which it will be of interest to return at some other time.

THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

On Thursday, October 9th, a special meeting of the members of the Home Counties District of the Association of Municipal and Sanitary Engineers and Surveyors was held in the Jury Room at the Health Exhibition. There was a large attendance. Mr. H. G. Lawes (Newcastle-on-Tyne), president of the Association, occupied the chair in the early stage of the proceedings, but subsequently resigned the position to Sir Charles Dilke, M.P. Among those present were Capt. Douglas Galton and Mr. Edwin Chadwick, C.B.

The business having been commenced by the Secretary (Mr. Thomas Cole) reading the minutes of the last meeting, which was held at Ealing,

Mr. O. Claude Robson (Kilburn) was, on the motion of Mr. C. Jones (Ealing), seconded by Mr. Hall (Torquay), unanimously chosen District Secretary for the ensuing year.

Mr. Lewis Angell first read a paper explaining the origin, the constitution, and the objects of the Association. Mr. Angell urged strongly that the erection of new houses should be strictly supervised by a staff of special officers, who should be remunerated by fees paid by the builders for the necessary supervision. Such powers had been obtained by Eastbourne and West Ham by private Acts of Parliament, but he argued they should be extended by a Government measure to the whole of the kingdom. The reason why the erection of new houses was not efficiently supervised was that the local surveyor had so many diverse duties, and was not provided with an adequate staff. He also referred to the want of building by-laws outside of the metropolis, and said that, even where adopted, they were frequently not properly enforced. The laying of drains should be made one of the first things done; and the law relating to the dedicating of private streets to the public, a subject bristling both with practical

and financial difficulties, needed considerable amendment. After pointing out other defects in the existing Public Health Act and the by-laws framed under it, Mr. Angell referred to the obstruction offered to sanitary improvements by interested members of local authorities,—men who had secured their return to promote their own personal interests and protect jerry builders and small property owners from their natural enemy, the local surveyor. It was impossible to speak out on this subject, because surveyors had not the protection which the Local Government Board extended to workhouse officials. He urged that such protection was not only needed, but was desirable, and that the status and functions were quite as good and as important as those of a poor-rate collector, over whom the Government spread its protecting ægis. Passing to the qualification of sanitary officers, Mr. Angell said :—

"It must be admitted that the charge of inefficiency has had some force with regard to some of the smaller towns, and even to larger towns which make small appointments. Sometimes these positions have been given as a reward for local party services, or out of charity,—to a local builder, for instance, a 'practical man,' who had failed in his jerry speculations. There is on record the case of the appointment as surveyor, by his fellow townsmen, of a bankrupt linen-draper, 'because he had been used to measuring.' But such things, if not very remote, are becoming things of the past. The greatest difficulty is in small places and with boards of small calibre; the remedy would appear to be in county government. The action of recent public opinion has resulted in the demand for and offer of better inducements to sanitary engineers and surveyors of professional standing and experience. Among our number are many members of the Institution of Civil Engineers, and of the Royal Institute of British Architects, and I think it may now be safely asserted that every important centre of population has the services of a fully-competent sanitary surveyor, although he may be hampered in his work in the ways I have previously indicated.

A society, junior to our own, is seeking to impose on local surveyors an examination of competence, of which they, the Sanitary Institute of Great Britain, shall be the judge and dispenser of certificates. I think the members of our Association would, in their own interest, generally assent to the principle of examination. We would even extend the principle further, and apply it to the members of local authorities. In a profession like ours, practical experience is of far more value than the cram and book-work which may qualify for a certificate, but not for the responsibility of office. But, admitting the examination, who are to be the examiners,—a newly-constituted society of persons having themselves no guarantee of qualification, or some of the older chartered professional bodies which have our confidence? Our own Association is senior to the Sanitary Institute, and composed exclusively of, so to say, picked men,—that is, sanitary engineers and surveyors by profession, each selected from a large number of other candidates, to fill a public office, without which qualification no one is eligible as a member of our Association. If it be objected that we should not give confidence by examining ourselves, then we have the Institution of Civil Engineers and the Royal Institute of British Architects, having charters half a century old. The latter body, of which I have the honour of being one of the Board of Examiners, is charged by Parliament with the duty of conducting examinations for the office of District Surveyor under the Metropolitan Building Act, and the Institute has extended the examination to the office of local surveyor. The diploma of the Royal Institute of British Architects would certainly carry greater *prestige* than that of a newly-formed non-professional society. There are also the Universities, or the Civil Service Commissioners, or a joint examining board might be formed of some of these bodies. We have no antagonism to the general objects of the Sanitary Institute, of which body, indeed, I am a Fellow; we wish the Society every success in educating the public in promoting sanitary progress, but, as professional engineers, we decline to admit the claims of a new *dilettanti* society to examine us."

Professor Henry Robinson, M. Inst. C.E., followed with a paper on "Sanitary Legislation and its Enforcement." He said,—The Public Health Act of 1875, and the Metropolis Local Management Act of 1855 (the latter Act constituting the Vestries the sanitary authorities for the metropolis), contain provisions for the protection of the public from avoidable sanitary dangers, which if vigorously put in force would remove many evils which call for drastic treatment. If these Acts were framed now, they would doubtless be drawn with less of the optional or permissive and more of the compulsory element than is found in them. At the time, however, when they were passed, public opinion was not nearly so alive as it is now to the consequences attending sanitary neglect. It is a fact that in many respects even the existing mild legislation is not put into operation. This arises from two causes, one being the ignorance or indifference of the sanitary authority to carry out the powers confided in them, and the other being the legal difficulty and expense which an individual ratepayer has to meet in order to compel his sanitary authority to exercise their powers when they had failed to do so. Take one point which is of very common experience. The sanitary authority is either apathetic or obstinate as to remedying a condition of things which is injurious to health. The evil and the remedy are both obvious. The Acts prescribe that the course of action is by representations to the officers of the authority. But these officers may be the offenders themselves, either by neglecting to take the matter in hand, or by being unable to obtain from their authority the necessary permission to rectify it. This neglect or want of appreciation of the evil by the authority is of constant occurrence, and is due to the fact that a very large number of those who compose the corporations, local boards, and vestries are deficient in zeal for the public good, as regards health, and in many instances have vested interests directly antagonistic to any action being taken.* Where the desire to suppress inquiry exists it is difficult for it to be brought about. The officers are all appointed by the board. A too zealous official soon gets removed. The remedy, we think, is for the Local Government Board to take prompt action on the memorial of any ratepayer, and to take the necessary steps to immediately remedy the evils complained of. Further, the sanitary inspectors and similar officials should not be wholly dependent on the sanitary authority. It is also very necessary for all officers of health to be subjected to an examination in test of their fitness for the duties they seek to discharge. In my experience most unfit and incompetent persons are appointed by local authorities to administer the Public Health Act. Having acted for some time as one of the Examiners of the Sanitary Institute of Great Britain in granting diplomas for surveyors and inspectors of nuisances, I have had opportunities of testing the fitness of many men holding important positions of this kind. A great amount of preventible mortality arises from houses being occupied which do not conform to the most elementary rules of house sanitation. A fruitful source of mischief arises from defective drains, water-fittings, and plumbers' work, which being hidden from sight is often performed by unskilful or dishonest men. This class of work requires the most stringent regulations to ensure its proper execution. We would require every man engaged in it to be certificated and registered, as we are confident that without such a system to protect the public, the existing bad work and consequent mischief will continue. We might advantageously copy the example which has been set us by the City of New York. In the year 1881 an Act was passed to secure the registration of plumbers and the supervision of plumbing and drainage in the cities of New York and Brooklyn. This Act was the outcome of a public movement which was set on foot by those who appreciated the evils we have referred to. Amongst the most prominent of these reformers, and the one to whom the passing of the Act is chiefly due, was Mr. Henry C. Meyer, the proprietor of the *New York Sanitary Engineer*. It should be mentioned that in the Health Exhibition there is an exhibit of Mr. Meyer for the purpose of showing to the British public how the State of New York has dealt with some of the sanitary evils with which we are grappling.

Mr. H. Percy Boulnois, M.Inst.C.E., Borough Engineer of Portsmouth, read a paper showing "The Effect of Municipal Government upon Sanitation." The water-supply, he held, should always be in the hands of the local authority; but often this was not the case, from the fear of interfering with vested interests, or the first cost of acquisition. In some instances there was worse neglect, by permitting an insufficient or impure supply of water to be used, instead of providing a pure and sufficient supply. The sewerage of a district, which must of necessity be in the hands of the local authority, was second only in importance to the water supply. Permissive legislation led frequently to nothing being done, and the difficulties connected with the removal and disposal of sewage were made the excuse for inactivity. The supervision of house-drains was generally inadequate and a mere form, and it would require a far larger staff of officials to attend to it properly than a local authority is at all likely to supply. With respect to defective house-drainage, some easier and less cumbersome mode of procedure than than afforded by section 41 of the Public Health Act is required, to secure a prompt remedy. The delay entailed rendered action almost useless in such cases, and a few authorities had been obliged to obtain private Acts. Scavenging was also a most important duty. The duty was often greatly neglected, and the practice of storing large heaps of house refuse, to effect a sale of some portion, and thus bring in a small revenue, was much to be deprecated. Some improvement was needed where new streets are required, as great cost for compensation has frequently to be incurred. Mistakes as to soil and position were often made in the selection of cemeteries, and as population increases, cremation will doubtless have to be substituted for the present system of burial. He also strongly urged that all public works should be of the best and most substantial kind, but frequently a false economy resulted in the lowest tender being accepted.

The discussion which took place upon these papers, including an important speech by Sir Charles Dilke, will be found in a special report on another page of this week's *Builder*.

Additional papers were read by Mr. Robert Godfrey on "The Removal of House Refuse," by Mr. S. C. Trapp on "The Destruction of Excreta," &c., and by Mr. George Winship on "Some Advantages and Results of the Supply of Water by Meter in Domestic Consumption." To these we may return.

* One of the latest illustrations of this fact is reported in the *Pall Mall Gazette* of Wednesday last. A member of one of the Metropolitan local vestries or district Boards of Works is the owner of some property which, on the showing of the sanitary officer, is in so insanitary a condition that there is "eighteen inches of sewage in the kitchen." The Sanitary Committee have the courage to act upon their own responsibility when the matter is brought before them by the officer during the vacation, and, as the owner of the property refuses to put it into proper condition, they order the work to be done. When the report of the Committee comes up before the Board, there is, apparently, one of those acrimonious and recriminatory "scenes" which have done so much to bring small local authorities into contempt, and, in the end, the Board adjourns without having adopted its Committee's report.—Ed.

THE ALBO-CARBON LIGHT.

Amongst the numerous claims for the best illuminating medium, whether gas or the electric light, we venture to think that the albo-carbon light will "hold its own" in either case. The recent successful application of this system at the new Brompton Oratory has demonstrated its capability to bring out clearly the architectural features of our churches and chapels, and those who will take the trouble to visit the Oratory at night cannot but be much impressed with the effective appearance of that vast building, due to the brilliant, yet subdued light thrown over its area. The fathers of the Oratory are not only satisfied with the effect produced at night upon their gorgeous ritual by the albo-carbon light, but really seem to think there is almost more light than absolutely necessary,—a good fault, seeing that there are only eight twelve-light, two six, and two four-light clusters in the whole building, lofty as are its proportions.

On the ground of comparative economy, as against the ordinary system of gas-lighting, some interesting experiments have recently been made,—in the one case with a single light by Professor Keat, and in the other by Mr. F. W. Hartley (the gas engineer), with a cluster-light burner. With a single light it was found that by a consumption of 5 cubic feet of gas per hour, an illuminating power was produced of 36·7 candles, whilst one eight-light cluster, burning 30·7 cubic feet of gas, gave an illuminating power of 271·5 candles. These figures speak for themselves, but in addition to the greatly enriched power of the flame produced is the fact that with the increase of light there is a very considerable diminution of heat, which is a most important feature, and indeed, is one of the chief recommendations of this very beautiful system of lighting.

The Dairy Show.—At the ninth annual show of the British Dairy Farmers' Association, held at the Agricultural Hall, London, the first premium and silver medal have been awarded to Messrs. Clark & Moscrop, architects, Darlington, for the best plan arrangements for model dairy farm-steading. There were fourteen sets of drawings.

Illustrations.

THE NICHOLSON INSTITUTE, LEEK.

THIS Institution, which was opened this week with much ceremony, and of which we give a view as well as the two principal plans to a small scale, occupies a very central site in Stockwell-street, facing south to Market-street, whence an imposing and effective view of the grand entrance, with its lofty domed tower, is obtained. This view is diversified by one of the ancient houses of Leek, stone-built and ivy-clad, "with many blinking windows, row on row," which, by the removal of a neighbouring modern building, it has fortunately been found practicable to preserve. With its quaint garden of sunflowers and hollyhocks it imparts a charming old-world flavour to the whole scene, and contributes very largely to the success of the *tout ensemble*.

The style of the new buildings is a somewhat severe form of Classic Renaissance, and the materials used are thin, hard-fired local bricks with black joints, dressings of red Roche and mottled Alton stone, and Broseley tiled roofs. All the windows are glazed with faintly-tinted antique glass in lead quarries.

The leading feature of the front is the tower, which rises to a height of about 100 ft. from the street. This has the spacious principal entrance doorcase at its base, supporting in the same composition the great staircase window with pedimented crown with carved urns; and large elliptical lights in each face of the upper stage. The domed roof and lantern are covered with sheet copper, which in a few years will, no doubt, assume the green *paten* which strikes one so often sees on such features in the old Dutch and other Continental towns.

The façade between the gable and the tower has a stone balustrading with urns, and contains a large window lighting the hall. The fanlights contain the effigies of four eminent men, representing the four last centuries, carved in high relief in stone from models by Mr. Stephen Webb, which are hung in the building. Tennyson stands for Literature and the nineteenth century; Sir Joshua Reynolds for Art, and the eighteenth; Sir Isaac Newton for Science, and the seventeenth; while Shakspeare for the sixteenth century may be said to reflect Humanity *in toto*. Above these "animated busts" a carved scroll supported by griffins carries these words of John Milton's "Areopagitica":—"A good booke is the pretious life-blood of a master spirit, embalm'd and treasur'd up on purpose to a life beyond a life."

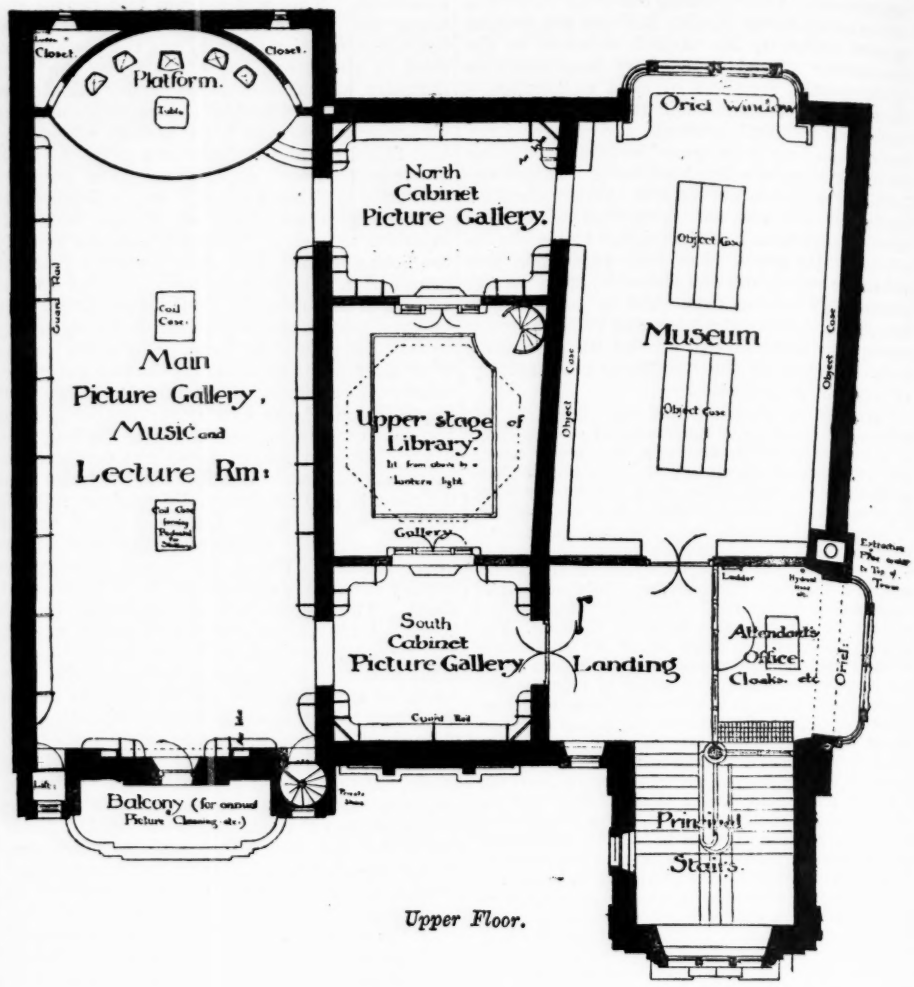
Internally the building consists of three floors, the central one elevated some 9 ft. above the street. On this floor the various reading-rooms, &c., are located; the floor beneath it contains the School of Art, &c., and that above the museum, picture galleries, &c.

The first floor is lighted by clearstories, or vertical lights on each side, with a solid ceiling intervening between them: the effect of which is certainly comfort and substantiality,—to be infinitely preferred to the flat glass shed roofs now so largely adopted in picture galleries. The height of the large rooms is 33 ft., and this enables the glazing to be kept high enough from the floor to prevent any possibility of "glitter" from refracted light upon the pictures. The gas-lighting, which is by continuous jets, is similarly arranged; and in such a way that it lights the gallery by night at about the same angle as the day-light enters.

Every precaution has been taken against fire. The floors throughout are of iron and concrete, paved solidly with thick wooden blocks, laid parquet-wise in bitumen; and on each floor are hydrants with leather buckets and branch pipes and hose, slung on rings and chains, ready for immediate connexion.

The ventilation has had special attention. Fresh air supplies abound; and the over-heated and vitiated air is drawn off from each room at a high level, and conducted by shafts to a large flue in which the air is artificially rarefied. This flue discharges from the louvred lantern at the top of the tower. The warming throughout is by the low-pressure system of hot water, by which a constant and genial heat is secured, and the deterioration of the atmosphere attendant on so many other methods is avoided.

The School of Art comprises an elementary school, 25 ft. by 37 ft.; an advanced room, 20 ft. by 32 ft.; and an antique and life room, 25 ft. by 25 ft., with head-master's office and



THE NICHOLSON INSTITUTE, LEEK.—*Plans.*

: TOMB :
OF · LORD · TREASURER · BURGHLEY
In the Church of S. Martin Stamford

Gerald Horsley, delt.

C. F. Kell Photo-Lith & Printer, 6 Castle St. Holborn, London E.C.

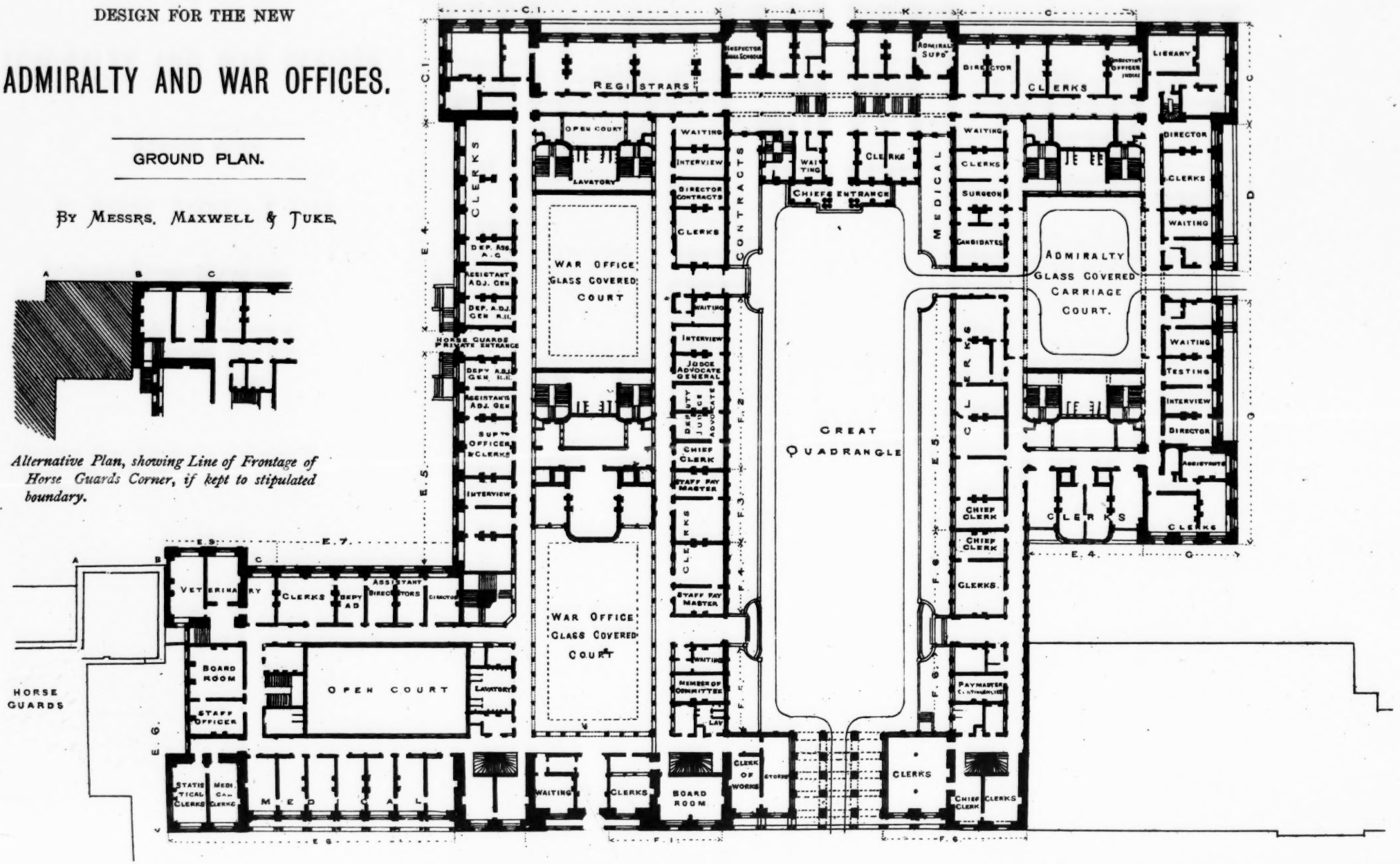
DESIGN FOR THE NEW

ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

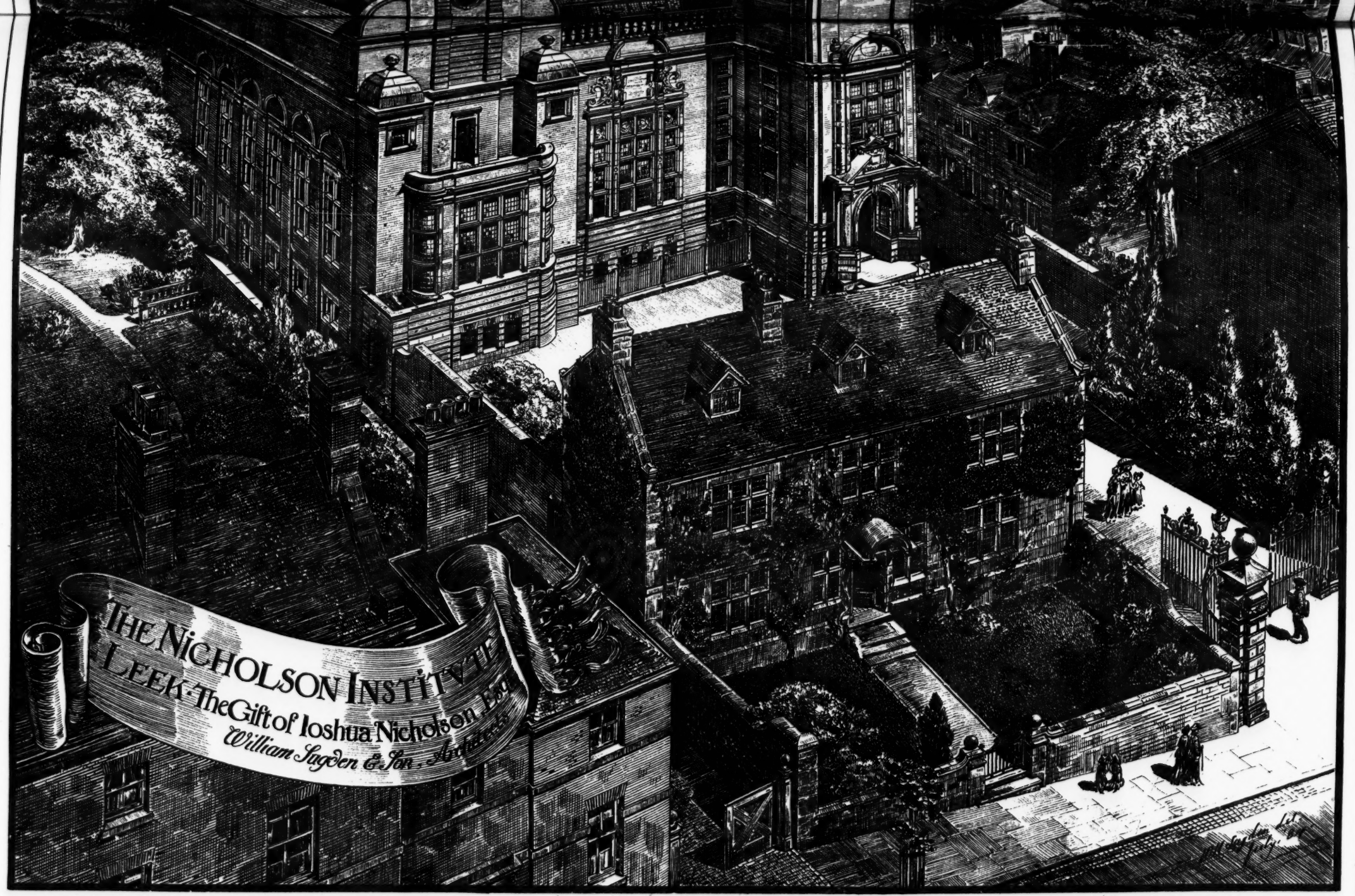
BY MESSRS. MAXWELL & TUKE.

Alternative Plan, showing Line of Frontage of Horse Guards Corner, if kept to stipulated boundary.



Wyman & Sons, Photo-Litho.

C^t Queen S^t London, W.C.



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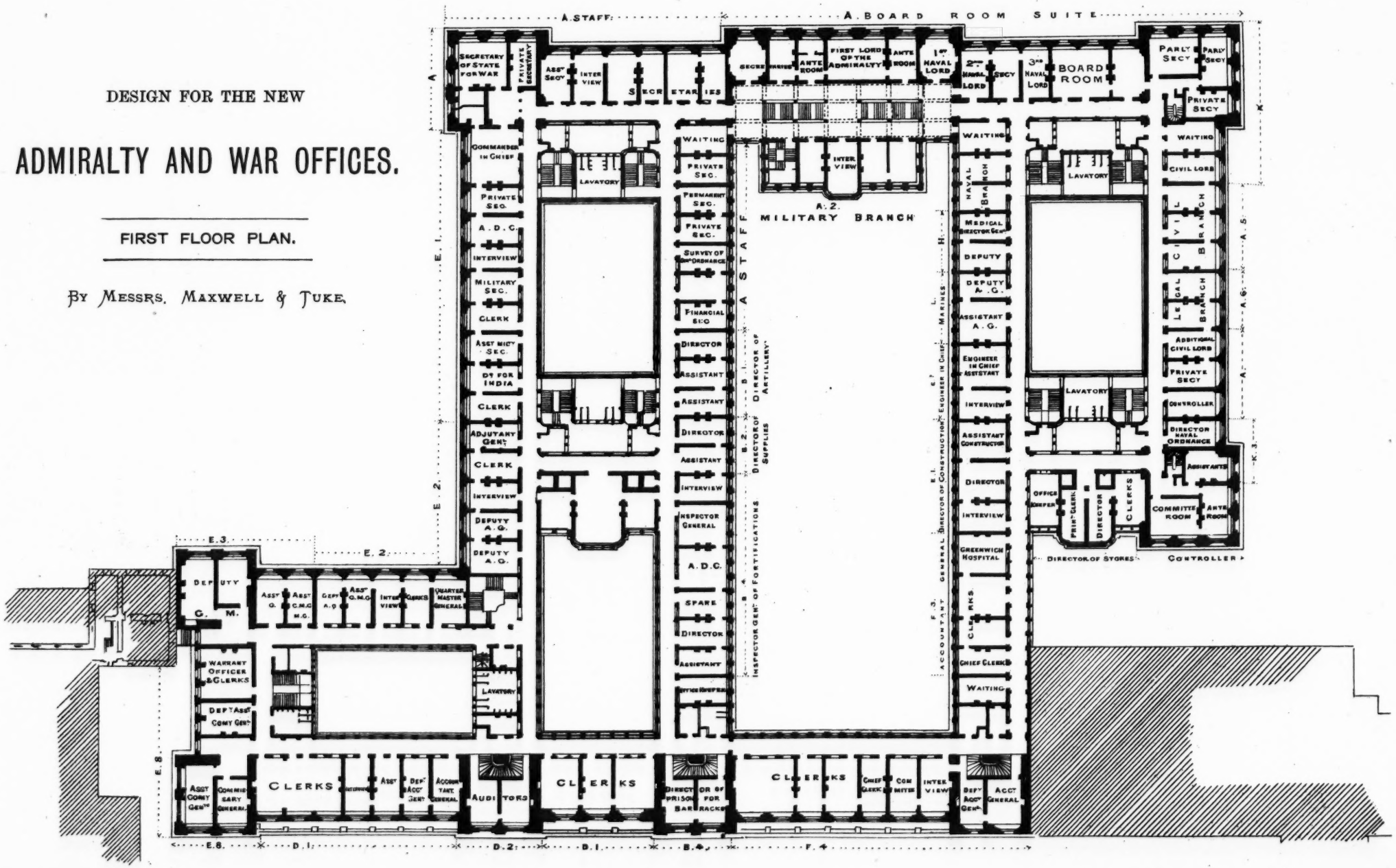
DESIGN FOR THE NEW

ADMIRALTY AND WAR OFFICES.

FIRST FLOOR PLAN.

By Messrs. Maxwell & Tuke.



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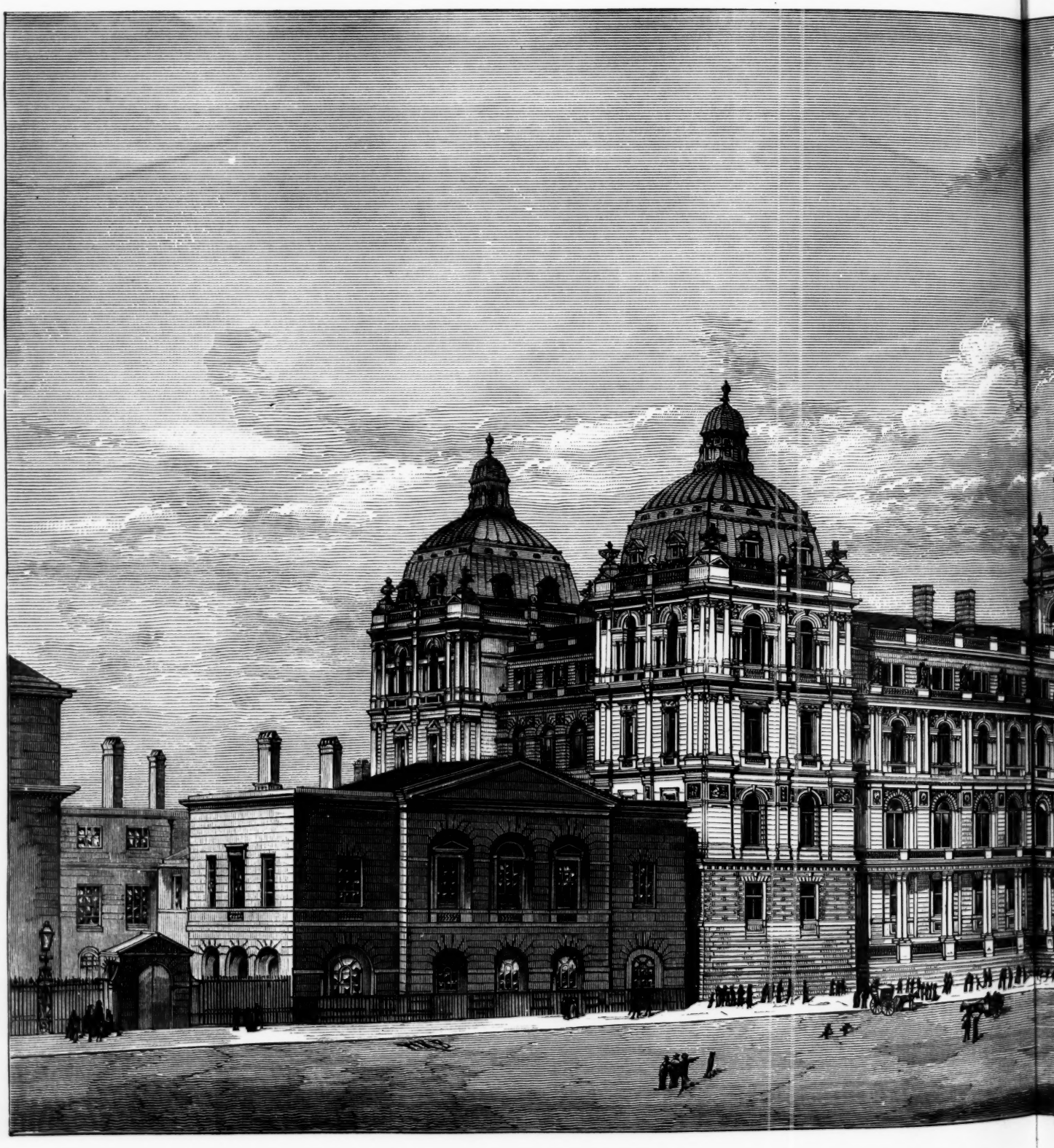


DESIGN FOR NEW ADMIRA

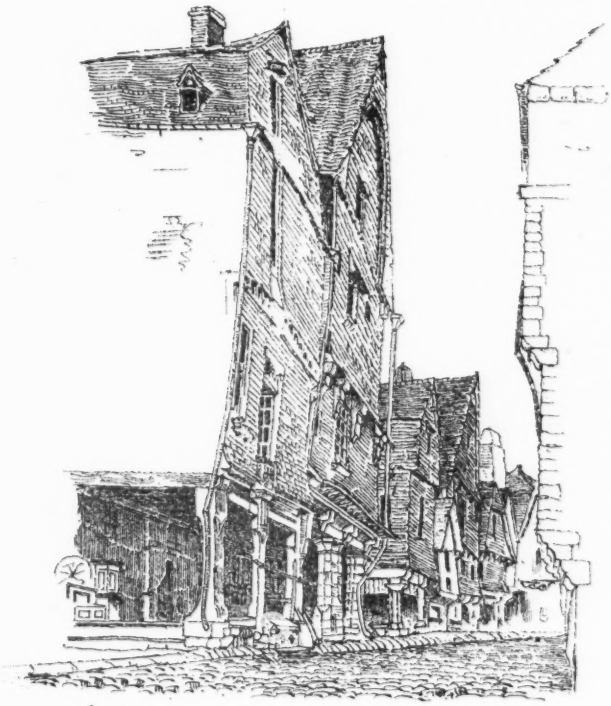
By Messrs. Maxv

Whitehall

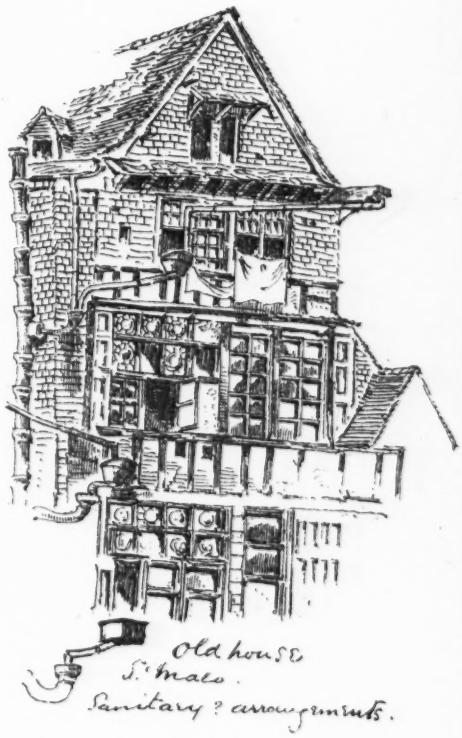
IRALTY AND WAR OFFICES.

. MAXWELL & JUKE.

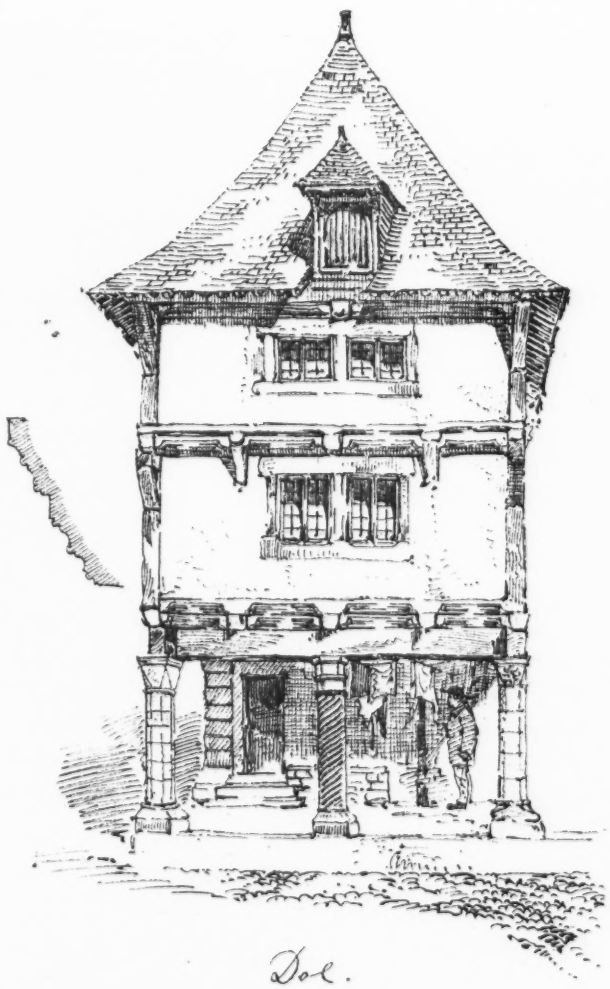
Whitehall Front.



Vitré rue Poterie



Old house
St. Malo.
Sanitary? arrangements.



Dol.

Dinan House near River

C. F. Kell Photo-Lith & Printer.

8 Castle St. Holborn, London. E.C.

SKETCHES BY A DISTRICT SURVEYOR. No 1.

stores, entrance vestibule, male and female cloak-rooms and lavatories, &c. These rooms have been very tastefully and completely furnished by the committee of the Leek School of Art, and are well appointed in valuable casts and copies from South Kensington, &c. The head-master is Mr. Joseph A. Kean, late head-master of the York School of Art. Sloping north lights are secured in the principal rooms, and at night ventilating sun-lights are used.

The whole of the works, including all details of decoration and furniture, have been carried out to the designs and under the superintendence of Messrs. William Sugden & Son, architects, Leek.

The following firms have been engaged upon the various branches of the work, viz.:—The builders, Messrs. H. & R. Inskip, Longton, whose assiduous foreman, Mr. Johnson, has very satisfactorily superintended the progress of the structure; Mr. Edwin Phillips, Leek, for the plumbing, painting, &c., and the duresco decorations of the interior; the heating, &c., by Messrs. Haden & Sons, Trowbridge; Mr. Roger Lowe, Farnworth, the iron and concrete and wood block flooring and waterproof concrete flats; the Gateshead Stained Glass Company the lead quarry glazing; Messrs. Minton, Hollins, & Co., Stoke-on-Trent, the tile floors; Messrs. Balfour & Co., Longton, the perforated tiles in coil cases; Mr. Millson, Manchester, the wood and stone carving and the sculptured medallions (the latter from models by Mr. Stephen Webb); Mr. Robert Hird, Shipley, the iron staging and spiral stairs of library,—the gun-metal patent casements and the guard rails in galleries; and Mr. Woodhead, Leek, other castings; Messrs. Elgood Bros., Leicester, the wrought-iron entrance-gates, and all the bronze door-handles and metal fittings throughout, except such as were provided by Messrs. D. Cartwright & Son, Leek; Messrs. T. Brawn & Co., Birmingham, the wrought-iron and other gasfittings; Messrs. Young & Glover, Wolverhampton, the locks, &c.; Messrs. W. Tonks & Son, Birmingham, the patent book-shelf fittings; Messrs. Braby, Liverpool, the copper covering of tower dome; Mr. Blackburn, Nottingham, the lightning conductor; Mr. Hindshaw, Manchester, plaster modelling; and Mr. John Shaw, Bowdon, the planting of quadrangle and approach. The furniture of the Institute was supplied by Messrs. Inskip, Longton; Messrs. Kendal, Milne, & Co., Manchester; Mr. A. Overfield, Leek; and Messrs. Eckstein, Birmingham; that of the School of Art by Messrs. Mackrell, Nixons, & P. Tomkinson, builders, of Leek.

The whole outlay in connexion with the undertaking has been generously borne by Mr. Joshua Nicholson, a silk manufacturer, of Leek, and a citizen for many years prominent in every local or general movement for the popular good.

DESIGN FOR ADMIRALTY AND WAR OFFICES.

BY MESSRS. MAXWELL AND TUKE.

We give this week the Whitehall front and, as in other cases, the two principal plans, of Messrs. Maxwell & Tuke's design as submitted in the second competition. Of the plan we have already observed that it is in some respects one of the best, if the normal objection to a not very wide closed quadrangle be put on one side; the rooms are well grouped in reference to their respective uses, and the traffic lines of the plan reduced to the greatest simplicity. There is, however, the defect which it shares with some others of the plans which are otherwise praiseworthy, viz., the employment of long and narrow rooms with one not over large window at the end. At some times of the year in London such an arrangement would practically render one half of the room useless for work except by artificial light. The design we cannot care for much: the spirit of Manchester seems very predominant in it, and this is the more emphasised by comparison with the Horse Guards building, to which the new building disdains to accommodate itself in any way. The following extracts from the architects' Report may assist in rendering clear their intentions:—

"We desire to call attention to the disposition of the central quadrangle with its three surrounding glass-covered courts, its open court near to the Horse Guards, and the four spacious courts lighting the secretaries' messengers' rooms and cross corridors.

The quadrangle is 280 ft. long and 113 ft. wide, and bountifully lights most important offices on three sides and a corridor on the fourth side, and by means of areas 15 ft. wide it renders the basement offices on both sides as valuable as if on the ground level.

The chief approach to the quadrangle is by three broad archways from Whitehall; the central one being for carriages and the sides for pedestrians. The total width of this entrance is 43 ft.

The second entrance to the quadrangle is from Spring-gardens after passing through the Admiralty Court. The width of the carriage entrance in Spring-gardens is 3 ft. wider than the central entrance to the quadrangle of the new Government Offices in Charles-street.

It will be observed that five principal entrances to the Admiralty and War Offices open into the quadrangle, that under the *loggia* to the west being the principal entrance for the chiefs of the staff on the War Office side as well as for the Lords of the Admiralty. The two entrances on each side of the quadrangle give direct access to important sections of the War Office and Admiralty.

The glass-covered court upon the Admiralty side is in reality a spacious hall, 90 ft. by 60 ft., in addition to the arcade on two sides on the ground-floor, and the surrounding corridors on the upper floors. There are four entrances to the Admiralty from this court, leading at once to the feet of the four principal staircases, and it will be observed that no office of any importance opens directly into the open court, but that all the office doors open from the corridors.

It will be seen that this system of lighting gives splendid results, not only to the corridors, but also to the adjacent offices, which will thus be as well lighted at the rear as on the window side.

The two covered courts to the War Office are intended really to be entrance-halls, and, there being no carriageway traversing them, will be much warmer than the Admiralty court. For this reason we have not thought it necessary to isolate the offices on the ground-floor by means of corridors.

The court near the Horse Guards is open down to the basement-floor, and forms here a sort of house-yard for the dwellings surrounding it. There are cloisters on two sides, and an approach out of the Horse Guards Parade.

It will be seen that, with the exception of the messengers' lobbies, not a single office obtains its light from the covered courts. These are devoted solely to the illumination of the corridors, messengers' lobbies, waiting-rooms, committee-rooms, libraries, lavatories, and stairs.

The eastern end of the great quadrangle is devoted, on the upper floors, to the lighting of the corridors, but with this exception the whole of the quadrangle, Whitehall, St. James's Park, Horse Guards, and Spring-gardens fronts are devoted to offices, and no portion of these valuable frontages is wasted upon water-closets, staircases, or other secondary purposes.

Whilst referring to this portion of the site we had better explain the leading idea dictating our arrangement of the pavilions flanking the Horse Guards Parade:—We observe in the block plan supplied to us certain dotted red lines indicating proposed new buildings on the south side of the Horse Guards Parade arranged in such a way as to form a noble square, of which the old Horse Guards would be the centre. In designing the Park and Parade fronts we have, therefore, assumed that the features of our design, if successful, would be repeated on the opposite side of the square, and this consideration has determined the position and design of the massive sentinel-like pavilion at the south-west, or Secretary of State corner, as well as the two slighter pavilions commanding the Horse Guards, which will form so conspicuous a feature in driving up Whitehall.

The style of architecture appears to have been dictated to us by the existing new buildings in the immediate locality, as also by Messrs. Inigo Jones's beautiful hotel in Whitehall.* (!!) It appears to us that any building not in perfect accord with these examples would destroy the unity of the grouping which we have studied to maintain."

Key to References on Plans.

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. ,, Supplies.
  B 3. ,, Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. ,, ,, ,,
  C 2. ,, ,, ,,
  C 3. ,, ,, ,,
  C 4. ,, ,, ,,
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

* So in the copy of the report furnished to us by the architects.

TOMB OF LORD TREASURER BURGHLEY, IN ST. MARTIN'S CHURCH, STAMFORD.

The tomb stands on the north side of the chancel, and is a fine specimen of late sixteenth-century work. The recumbent figure of the Lord Treasurer is in alabaster, and represents him in rich armour, and bareheaded; decorated with the insignia of the Garter, and holding the wand of office.

The different marbles in now faded colouring combine to enhance the effect of the whole. The drawing, which was in the last Academy exhibition, is by Mr. G. C. Horsley.

SKETCHES BY A DISTRICT SURVEYOR.

I.

Vitré.—The strangest and most bizarre of all the old streets are the Rue Poterie and the Rue Bondrairie. A confused mass of projecting wooden houses with penthouse roofs covered with thick slates, the ground floor being occupied by porches with a sort of square pillars supporting superstructures and forming covered galleries, into which open miserable shops. In some cases the buildings are ornamented by statuettes or sculpture.

Dol.—This and some other sketches which will appear are intended to assist the register of quaint buildings in this old town, which are from time to time being swept away under pretext of embellishment.

In the chief street are many old houses which preserve its Mediæval physiognomy the moulded woodwork of which, and variety of columnar design, will repay the trouble of noting. The example chosen has some such columns which support the superstructure, and form a public covered way.

Dinan.—The old house at Dinan, by the side of the river, was, in its day, probably of some importance, and its moulded woodwork, so characteristic of Brittany, may be studied with advantage. In the interior of the town are many streets which have conserved their original features, and on several of the buildings are figures of saints, mythological and grotesque subjects.

St. Malo.—The sketch of part of old house at St. Malo was made to exhibit the abominable arrangements of the place for disposing of house

refuse of every kind. Outside the window of each story (the house being let out in tenements) is fixed a receiver, syphoned after a fashion, and connected with a vertical stack of badly-jointed earthenware pipes.

THE ARCHITECTURAL ASSOCIATION
CONVERSAZIONE.

THE opening *conversazione* of the Architectural Association was held on Friday, the 10th inst, in the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly. There was a large attendance of members and their friends, but the crush was not so great as on the last occasion, for, as Mr. Cole Adams, the President, explained at the outset of his address, the Committee had, owing to the growth of the Association (which now numbers 995 members), been compelled to limit the number of invitations sent out to other than members of the Association. There was, as usual, a good display of drawings in illustration of the work done in the classes in competition for the various prizes; and there were numerous exhibits of "art-furniture," upholstery, decoration, paperhangings, &c. Mr. Alfred Newman had on exhibition some good modern ironwork, as well as an interesting collection of old Flemish and German specimens.

The greater number of the company having taken their seats in the Prince's Hall (which was very draughty and chilly, by the way), the President, Mr. Cole A. Adams, proceeded to distribute the prizes. The following is the Prize List:—

A. A. Travelling Studentship.—Studentship and Medal taken by Mr. G. J. Oakeshott. Second prize, value 5*l.*, taken by Mr. G. G. Woodward. Honourable Mention made of Messrs. W. H. Bidlake, G. G. Wallace, and E. H. Selby.

Association Medal.—Taken by Mr. Arthur Sykes.

Class of Design.—First prize, value 3*l.* 3s., taken by Mr. C. C. Bradley. Second prize, value 2*l.* 2s., taken by Mr. F. S. Granger. Honourable Mention made of Mr. W. Dewes.

Elementary Class of Design.—First prize, value 2*l.* 2s., taken by Mr. F. M. Day. Second prize, value 1*l.* 1s., taken by Mr. A. H. Hart. Honourable Mention made of Mr. Ferguson.

Colour Decoration Class.—First prize, value 3*l.* 3s., taken by Mr. A. W. Hennings.

Architectural Union Prize.—Not awarded.

Class of Construction and Practice.—First prize, value 3*l.* 3s., taken by Mr. S. H. Seager. Second prize, value 2*l.* 2s., taken by Mr. Frank Massie. Third prize (presented by Class), value 1*l.* 1s., taken by Mr. H. P. B. Downing.

Class for Study of Planning and Specification Writing.—First prize, value 3*l.* 3s., taken by Mr. Ernest A. W. Barnard. Second prize, value 2*l.* 2s., taken by Mr. M. Collins.

Sketch Book Title-page Prize, value 5*l.* 5s., taken by Mr. William A. Pite.

Essays.—First prize, value 5*l.* 5s., taken by Mr. E. P. Tucker. Second prize, value 3*l.* 3s., taken by Mr. Lionel Littlewood.

Lectures on Construction.—First prize, value 3*l.* 3s., taken by Mr. N. C. H. Nisbett. Second prize, value 2*l.* 2s., taken by Mr. Herbert S. Saunders. Third prize, value 1*l.* 1s., taken by Mr. J. W. Stonhold.

Lectures on Architecture.—First prize, value 3*l.* 3s., taken by Mr. G. T. McCombie. Second prize, value 2*l.* 2s., taken by Mr. H. Abraham. Third prize, value 1*l.* 1s., taken by Mr. Norman C. H. Nisbett.

The President then proceeded to deliver an address, in the course of which he said,—

It is one of the obligations of the office of president to deliver an address on the occasion of the annual *conversazione*, and one of the obligations you have entered into this evening by the attendance you have honoured us with is to listen to it. I see no escape for either of us. I will endeavour, however, to be as brief as possible, so as not to weary, and you, on your part, will kindly extend to me your patience for a short time, before adjourning to lighter and more congenial amusement. You have just witnessed a ceremony which, I hope, has interested you; the rewards of merit have been made more valuable to the gainers of them by your generous applause, and that touch of sympathy which every one values. The ceremony of bestowing the prizes has been a very short one, but it has taken a year's work to win them. On the walls of the gallery above you will see something of the labour involved, and I hope you will not leave this evening without at least a glance at them. You will see how much labour it takes to win distinction, and obtain some idea of the study required to make an architect. What you will there see is but a fraction of what is necessary for that purpose. The Architectural Association was established several years ago for the object of mutual improvement and instruction in the art of architecture, and upon a voluntary basis. The senior members impart instruction to the juniors, who, in their turn, become teachers. We have lectures, classes, discussions, and exhibitions, for the study of design and construction, and in our ranks are all sorts and conditions of men, who go to make up the profession. Among these are those who are in practice, but who retain their names on the list of members from the affection they bear to the society which has aided them in their work, and their desire to keep touch with those who yearly join it, and many remain in the ranks to render help in the work carried on. Others, and a large proportion, are in offices as assistants, anxious to avail themselves of the instruction to be obtained at a very small cost; and lastly, we have yearly drafts of young men who are serving their articles, and have just entered on the duties of the profession they have selected. The advantage of this chain of connexion from the first link in the professional chain to the last is obvious, and helps the creation of an *esprit de corps* and kindly sympathy which is most advantageous. We claim that the Architectural Association is a unique body, doing valuable service to the public and to the profession, breaking down the barriers of little jealousies, and forming that union which is strength. . . . . To those who have given any attention to the study of architecture, the progress that has been made of late years must be apparent. A glance only at the exhibits in the galleries upstairs so kindly and generously lent to us for this evening, and contributing so largely to the enjoyment of it, will go a long way to prove this assertion. These exhibits, it is true, are only accessories to architecture, but they are the outcome of the improvement which has taken place of late years. Many of the objects on view are designed by architects in practice who are members of this Association, and all the exhibits will repay your careful examination. It is too much the fashion to sneer at modern architecture and those who practise it; but let any one whose eyes are not hopelessly blind examine with care and attention the buildings, both ecclesiastical and civil, which have been erected during the last quarter of a century, and one may go further back than that. The Gothic revival has produced men who have covered the land with churches and buildings, many of which are masterpieces of design, and which I venture to think, future generations will do greater justice to, and treasure them as precious legacies. The works that will live are the creations of minds which have devoted their lives to the study of their art, men who have unceasingly toiled to learn their craft, and who have ransacked the treasures of the past with an absorbing love for the work, which is above praise. There are very few old buildings in this country, or on the Continent, that have not been visited, and careful drawings made of such parts which would serve for study and be useful in practice. That the result of this should be a too close resemblance to ancient architecture, justifying the charge of forgery in many cases, is natural, but in the works of the best masters and by their works progress in modern architecture should be judged. You will always find originality and a distinct adaptation of forms to modern usages, and any one well acquainted with old work will at once distinguish and appreciate the merits of the modern. The old Gothic architects were just as much copyists as the modern ones, or else how is it that the same plans, the same features, the same forms, and the same mouldings may be traced in buildings, from one end of the country to the other, and in far less variety than you see now in modern work.* The great advantage the old builders possessed over ourselves was that they were happy in living in an age when they could practice their art in one style, and so bring it to greater perfection. Changes came very slowly to them, and men were left more to the quiet contemplation and development of their art, and to practice it free from the competition, rush, whirl, and excitement that attend upon us moderns. So much of the charm of old work lies in its antiquity and in the sentiment that surrounds it. Time is a skilful artist, and with loving hands colours the walls and roofs, gently tones down the interior, darkens the woodwork, knocks off sharp edges, softens and refines any crude contrasts, and produces generally that charming *ensemble* we call picturesque. There are many old buildings which, if the magic wand could pass over them and change to what they were when the builders left them, would be passed by as unworthy of notice. Do not think for one moment I am drawing comparisons to the disadvantage of the past; far from that is my intention; but I plead for a fairer and more honest examination and judgment upon the work of the present, and for greater discrimination. I do not assert that the Gothic revival has produced work so grand and noble as the source from which it has sprung; the wonder is that such progress towards perfection has been made amidst difficulties which only those who adopt our profession can have any distinct knowledge of. What has been done in time past it is possible the world may see again, and with the progress that has undoubtedly been made of late years is it too Utopian to hope that buildings shall yet arise which shall be a delight and wonder to coming generations? The hope of modern architecture rests much with the public. It is sad to the enthusiast to find how people, as a rule, care little for architecture at all, and yet how lavish many are in expressing their opinion about it. The facilities for travelling afford opportunities for visiting edifices which are the admiration of the world; but they are not studied by the mass; hasty judgments are formed, and opinions expressed, borrowed from writers good, bad, and indifferent. Such people fail to see the lesson taught by what they have visited, and to analyse the reasons for their likes and dislikes. Education is making rapid strikes in every branch, and, may be, in time a more intelligent reasoning will take the place of the indifference to the study of architecture which characterises us a nation. Should that time come, when architecture shall be studied with delight, then the sure outcome of this will be a revival which shall eclipse all our previous efforts. If, as the wheel of time goes round, men will turn to the study of architecture, they will become more critical in their judgment, and demand a higher standard of design and workmanship than they do at present. They will seek out for employment only those architects who are architects in deed as well as in name. In time, perhaps, a diploma will be granted to architects who are able to satisfy the examiners that they are men skilled in the art. Such a course would be a guarantee to the public, and shut out men who have no sort of right to be trading on the ignorance of their employers. A step in this direction has quite recently been taken, and no man can now become an Associate of the Royal Institute of British Architects without passing an examination: make it compulsory that no man shall practise without this test, and improvement will take place. Such a step might not produce all the results hoped for from the artistic side; that difficulty must one day be met by a college of architecture presided over by distinguished professors; but from the practical side great good would follow. Buildings would be erected that would be better in construction and planning, and in that most important condition, better in their sanitary arrangements. With the responsibility which a legal status would give, some obstacles would be raised up against speculative building which, as at present practised, is such an absolute disgrace in too many instances to the architecture, if it may be called so, of this country. As long as the public are content with the present state of things, there is no remedy possible, but in all fairness they should be discriminating in their censure of architects and their work, and not judge the architecture of their time from the houses most people are compelled to inhabit, which are, for the most part, the creations of men absolutely ignorant of design and plan. Let a taste for architecture be cultivated, then a demand will arise for good and intelligent design, and there is the material always at hand to meet the supply.

* Does Mr. Adams seriously mean to say that he does not perceive the enormous and radical distinction in principle between the two kinds of "copying" to which he refers?

Clocks.—The church at Great Houghton, Northampton, has just been enriched by having a large new clock fixed in the tower, which strikes the hours on a large bell, and shows time on two dials, each 4 ft. diameter. Messrs. John Smith & Sons, Midland Clock Works, Derby, have carried out the work. They have also erected the large new clock at Wootton Church, near Bedford. It strikes the hours on a large bell, chimes the ding-dong quarters, and shows time on a copper dial 5 ft. in diameter. It is fitted with all the latest improvements.

THE VENTILATION OF PRINTING OFFICES.

The necessity for the efficient ventilation of printing-offices must be apparent to many who have had occasion to frequent them, if not always to those who own them or work in them. No doubt the difficulties in the way of providing ventilation, without objectionable draughts, are great, especially in some of the older offices, although in some new buildings of the kind the means of ventilation are either inadequate or inconveniently primitive. As everybody knows, the production of a newspaper entails much nightwork, and, in the composing-rooms especially, a good light is essential. Hence the plentiful, not to say profuse, use of gas, and the consequent rapid vitiation of the air. Much improvement in this direction may be hoped for from the use of the electric light, but we believe it to be a fact that the lighting of composing-rooms by electricity has not yet proved altogether successful where it has been tried. However, whether gas or electricity be the illuminant of the future for printing-offices, ventilation will always be needed to remove the products of respiration thrown off by the large number of compositors and other workmen, and to bring in fresh air, warmed when necessary. In this connexion we are glad to be able to call attention to the fact that, with laudable consideration for the health of their *employés*, the proprietors of the *Daily Telegraph* have just had their composing-room ventilated by means which appear to be eminently successful, viz., by the Æolus water-spray ventilator, which appears to have been successfully used for ventilating the Life School of the Royal Academy, and many other public buildings. In the composing-room of the *Daily Telegraph*, 170 compositors work throughout a great part of the night, and seventy Argand burners light the "cases." Under the advice and direction of Messrs. Arding, Bond, & Buzzard, the proprietors have put a new and lofty roof, which is covered by a lantern along its whole length, the windows on both sides of the lantern opening in two divisions by lever bars at each end of the room. This provides an ample outlet for the vitiated air in summer time, or in calm moderate weather, when open windows are unobjectionable. Fresh purified air, either cold or warm as may be required, is driven in by a 16-in. Æolus Waterspray Ventilator fixed in the basement. The fresh air is delivered into the room by a series of fourteen 3-in. tubes, rising 5 ft. from the floor, and each, as shown by tests with the anemometer, capable of sending 630 cubic feet of air per minute into the room, without draught. In warm weather the cool fresh air is used to keep down the temperature to an agreeable point, while in winter the fresh air can be raised in a few minutes to a temperature of 100° by simply lighting the gas-burners around the tubes through which the fresh air passes. A continual supply of fresh air, equal to five times the cubical contents of the room, is thus afforded every hour, and of a temperature adapted to the sensitiveness of men engaged in sedentary occupations. Returning to the subject of extraction, when the weather is such as to render open windows undesirable (and in this climate of ours such an objection obtains for several months out of the year), the vitiated air is drawn off by two 16-in. Æolus waterspray ventilators, which have their communication with the composing-room through two panels occupying the position of two of the side-lights of the lantern; these are continued by 16-in. galvanised shafts outside the roof, which enter the composing-room again through the roof by the plate and descend through all the floors into the basement. In each of the last 6 ft. lengths of these shafts a waterspray is fixed, and by simply turning the tap a powerful exhaust is immediately set up, dragging down the vitiated air from the composing-room into the basement. A continued change of atmosphere is thus ensured for the composing-room, although doors and windows be tightly closed. Another peculiarity in this application of the waterspray as an exhaust is the fact of the upper part of the shaft, falling down the slope of the roof, being exposed to the action of the cold atmosphere outside; this condenses the carbonic acid held in suspension in the heated air, which by its own gravity assists the downward current.

We understand that the new offices of the *Daily News*, now in course of erection in Bouverie-street, Fleet-street, and of which we lately gave some particulars, will also be ventilated by the Æolus Water Spray Ventilator.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

211, Improvements in Exhaust Ventilators. George William Webb, Reading.

In this invention, a novel pattern of exhaust ventilator is made by fixing guards or plates in a peculiar manner at the angles or corners of a cowl. Perforated zinc or wire gauze is used instead of the ordinary louvre or shutter. The air rushing through the slits exhausts the vitiated air from the up-take pipe, and discharges it in the ordinary manner. The claim is really the arrangement of the shutters, which form four partitions around a central chamber.

1,533, Improvements in Metallic Sash Lifts. Charles Showell, Birmingham.

The improvement consists mainly in manufacturing metallic sash-lifts from sheet metal. It is principally adapted to such fixings as have a ring or loop in the centre, in which the finger is placed to lift or cover the sash. One piece of metal only is used, and from a T-shaped blank worked in a press or stamp, a loop of the ordinary pattern is made.

9,018, Improvements in the Manufacture of Fireproof Blocks or Slabs for Preventing the Transmission or Radiation of Heat. C. Toope, London.

This invention relates to the manufacture of hard coherent fireproof blocks or slabs from silicate cotton, asbestos fibre, and a solution of silicate of soda and pipe-clay. The fireproof blocks or slabs, when made of the proper shape, are especially adapted for protecting the joists of buildings; but they may also be used for covering steam-boilers, fireproofing wooden structures, and preventing the radiation and transmission of heat generally. The blocks or slabs may be composed of either the silicate cotton or asbestos fibre alone, in conjunction with the silicate of soda and pipe-clay, or they may be composed of a mixture of silicate cotton and asbestos fibre in any suitable proportion in conjunction with the mineral ingredients already mentioned, the proportion in which they are employed depending in either case upon their quality. In manufacturing the blocks or slabs, 8 lb. of pipe-clay are mixed with about one gallon of silicate of soda, and then sufficient silicate cotton or asbestos fibre (or a mixture of the two) is added, to form a plastic mass. The whole is then thoroughly incorporated in a pug-mill or otherwise. Afterwards the material is rammed into moulds of the desired shape, and the blocks or slabs turned out are baked in ovens at a temperature of about 175 deg. Fahr. until they are thoroughly dry. The blocks or slabs may be coated with asbestos sheeting or asbestos paper to give them a smooth surface, and this may either be done after the blocks or slabs are produced in the operation of moulding. In the latter case sheets or strips of the asbestos sheeting of the proper shape are laid in the moulds before the introduction of the plastic mass of composition, which is then filled into the mould and adheres to the sheeting or paper. In the former case the sheeting or paper would be cemented to the blocks, &c., after they have been baked by a cement composed of pipe-clay and silicate of soda in suitable proportions.

APPLICATIONS FOR LETTERS PATENT.

Oct. 3.—13,119, F. Mason and J. Conqueror, Sunderland, Manufacture of Rolled Plate Glass.—13,124, G. W. Elliott, Liverpool, Improvements in Axes, Hammers, Spades, Shovels, and other Tools.—13,143, H. Taff and C. R. Mathews, London, Water-waste Preventers, especially applicable for Flushing and Disinfecting Water-closets.—13,147, R. Oakley, London, Ventilating and Warming Buildings.—13,148, W. H. Lindsay, London, Improvements in Bridges.—13,152, T. Parsons, London, Boring Apparatus.

Oct. 4.—13,160, J. Law, Balsall Heath, Portable Hall Lantern Frame. — 13,164, R. H. Perks. Birmingham, Self-closing Waste-preventing Valve for Flushing Cisterns.—13,181, J. Rogers, London, Fire Partitions.—13,183, J. M. Stanley, London, Construction of Furnace, Boiler, and other Fireplaces.

Oct. 6.—13,125, J. Kretschmann, London, Water-closet Valves.—13,231, F. C. Hustler, London, Window-sash Fasteners.—13,237, J. W. Matteson, W. J. Chapman, and T. G. Matteson, London, Manufacture of Portland Cement. — 13,238, R. Hunter, London, Improvements in Kitchen Ranges.—13,243, Sherwood & Co., London, Manufacture of Cathedral Glass.

Oct. 7.—H. J. Allison, London, Improvements in Brick Kilns.—13,270, R. Entwistle, London, Water-tap.—13,279, J. C. Hudson and T. Bayley, London, Improvements in Locks.—13,284, F. George, London, Connexions for Lead or other like Pipes.—13,302, W. R. Lake, London, Machines for Manufacturing Wood Screws.

Oct. 8.—13,314, W. Lester and W. R. Lester, Glasgow, Glazing Bars or Astragals.—13,325, G. Moore, Lewisham, Combined Self-acting and Hand-actions for Water-closets, Urinals, &c.—13,332, J. T. Green and J. Green, London, Latching Mechanism for Swing Doors and Gates.—13,335, G. Richards, London, Machine for Grinding Planer Knives or Cutters, and similar Edge-tools. — 13,338, M. Sugar and L. Hidveghy, London, Apparatus for Stamping and Setting Stone Paving and other Blocks.—13,339, J. S. Bruce, Birmingham, Opening and Closing Ventilators.

Oct. 9.—13,350, J. W. Chalk Webb, Worcester, Kilns and Stoves.—13,355, W. Smith, Dublin, Waterproof Cement.—13,364, A. A. Joy, London, Sash-fastener.—13,375, J. A. R. Main, Glasgow, Iron or other Metallic Roofs.—13,377, J. Kemp and F. Fissi, London, Improvements in Earthenware Pipe Connexions.—13,379, A. Cuff, London, Improvements in Balconies.—13,380, J. J. Barclay, R. Allison, and J. Barclay, London, Kilns and Apparatus for Burning and Drying Bricks.—13,381, W. Wright, London, Mounting, Balancing, and Securing Window-sashes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,763, G. Macfarlane, London, Flushing Apparatus for Water-closets, Urinals, and Drains.—11,722, J. Hamilton, Derby, Wood Planing Machinery, and Cutters for same.—12,067, E. V. Bailey, Birmingham, Attaching Knobs to the Spindles of Locks and Latches.—12,368, J. Tottenham, London, Improvements in Hoists for Raising Materials for Buildings in course of erection.—12,499, G. H. Couch, London, Covering Roofs and other Parts of Buildings with Tiles.—12,589, E. Warburton and G. H. Warburton, Manchester, Planing and other Wood-working Machines.—12,619, J. H. Sams, London, Improvements in Mantel and Chimney Pieces.—12,765, W. Day, London, Kilns for Burning Bricks and other Articles.—12,780, W. J. Hinitt, Birmingham, Sewer-gas Interceptors for Drains.—12,875, W. J. Stokes, London, Improved Sash-fastener.—10,884, J. B. Fidler and T. B. Fidler, Wolverhampton, Lever Locks and Latches.—11,855, A. Lawrance, London, Decorating Glass. — 11,931, W. Morrison, New Swindon, Chimney-tops.—12,356, C. Cowney, Birmingham, Improvements in Closets and Urinals.—12,625, W. H. Chubb, Birmingham, Lever Locks.—12,761, C. D. Douglas, London, Improvements in Locks and Latches, and securing Knobs and Handles to the Spindles thereof.—12,821, T. Robinson, Bristol, Water Meters.—12,880, G. Trice, London, Lock Protector.—12,881, J. Menzies, London, Appararus for Cutting and Sharpening Stone.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

15, J. A. Walter, Rainham, Kent, Improvement in Locks.—84, J. D. Tucker, Bromley, Sliding Window-sashes.—441, E. V. Bailey, Birmingham, Converting and Adjusting Door-knobs to their Spindles.—1,738, R. Stanley, Nuneaton, Manufacture of Terra-cotta and other Clay Goods.—2,474, A. Shepherd, Birmingham, Machinery for Painting the Laths of Venetian Blinds.—125, A. Clark, London, Hydraulic Lifts.—512, J. Dean, Oxford, Self-acting Open Fire Ranges.—1,553, R. Wright, Richmond, Preventing Smoke in the Combustion of Coal in Open Fireplaces.—2,524, G. C. Davies, London, Improvements in Inspection or Access Pipes for House-drains and Soil-pipes. — 7,610, G. H. Chubb and H. W. Chubb, London, Improvements in Latch Locks.—10,596, Hans A. Hansen, Christiania, Improvements in Saw Sets.

THE DECORATION OF ST. PAUL'S.

Sir,—I addressed a few lines to your readers on the subject of the decoration of the dome of St. Paul's shortly after Mr. Pullan's paper at the Institute.

And I then took occasion to draw attention to some of the methods of decorating domes which had their internal concave finished as a smooth surface, and not constructed with deep coffers,—the majority of cases being treated as if there were no dome at all, but a vision of the heavenly host intervening; its very existence was a thing of the imagination only. And, further, I asserted that if it was desired to retain the form of the dome as an opaque concave roof covering, this could only be done by rejecting the impossible architectural forms introduced into Thornhill's paintings; for, though their incongruity might not be painfully apparent while executed in sepia only, when done in bright colours it would be absolutely unbearable.

I felt I was but repeating a generally accepted truism, but to my surprise Mr. Seddon and Mr. Cave hold a different opinion; and I am constrained to repeat my own. Sir James Thornhill depicted what Sir Christopher Wren declined to construct; that is to say, he represented the inner dome pierced with a series of lofty arches, through which the observer is supposed to see a tableau illustrative of the life of St. Paul, painted on the walls of the intermediate cone which sustains the lofty stone

lantern surmounted with the gilded ball and cross.

Now, it cannot be questioned that the continuation of a great picture round the lower half of the dome was a fine idea, and one surpassing all others from a pictorial point of view. But the obvious falseness of the architectural environment was unworthy of a palace of truth, and is objectionable to the taste of an age wherein the real is daily becoming more popular than the unreal.

Moreover, it would be shirking the problem and confessing our failure to compass it. While to assert that the nineteenth century can do no better than the seventeenth, and that, therefore, we should be content to sit at the feet of Sir Christopher (whose opportunities of study were comparatively limited), and be afraid to act upon the increased knowledge and artistic power of our time—to assert, I say, that this is what we are to learn from the example of the Renaissance architects, is a most singular conclusion to arrive at.

The Mediæval architects would have scorned to repeat in the fourteenth century the efforts of any preceding century; they trusted to themselves, and looked for inspiration from within or from above, to excel all that had been previously done, which is characteristic of true genius. But this was before the new birth of literature, when we were supposed to have gained all knowledge of good and evil; and straightway lost our power of independent action in the fine arts.

The late Mr. Stevens has, however, left behind him suggestions for the treatment of St. Paul's dome, which we may now see worked out in the rival designs exhibited on opposite sides of the dome itself,—both of which embrace his idea based on the fact that every plain section of a sphere is a circle. And this suggestion expressed Stevens's desire to preserve the representation of the true form of the great concavity. Mr. Stannus has carried forward Stevens's idea with the same object, and has knit together the circles by ribs, rising from the blocking over the unpierced piers of the peristyle. These ribs also express the form of the dome, and diminish proportionately as the circles diminish as they reach the summit of the cupola. Raised mouldings may be implanted on the ribs and the frames or stiles of the circular panels, provided always that their flat treatment is maintained, but no painted cornices or false construction is admissible.

The conditions of the problem have never been more nearly met, or more effectively and reasonably rendered, than by the design thought out by Mr. Stannus. Nevertheless, there is room for further study of the details and accessories, of the tone of the colouring, and the scale of the pictures, which can only be settled satisfactorily *in sitû*.

It is imperatively required that whatever is designed shall be treated broadly, and be suited to the position it is to take in scale and colour. It is much more an architect's province than a painter's to determine the leading lines and framework of the composition, and to prescribe the limits and scale of the decorations and pictures.

The plain wall below the peristyle, or podium behind the gallery-railing, seems to call for more decidedly flat treatment, in warm secondary colour. The ornament in relief and in bright colours would be better replaced by a band of figures, like that surrounding the Albert Hall externally, with seated figures at the four points of the compass, their broad outlines being well seen from below, their low-toned details being appreciated from the gallery.

The blocking-course over the peristyle is too much cut up and too low, especially when compared with that over the main order below, from which spring the domical ribs of the eastern apse.

The angle at which the light strikes the upper part of the cupola causes the gold mosaic to look brightest there, and so brings down the centre and dwarfs the total height, and apparently flattening the apex of the dome. This will have to be overcome, but, for my own part, I would rather see the whole done in marble mosaic: this would lower and soften the whole tone of the decoration, and give distance and haziness.

But in all these points the accomplished architect of the cathedral, Mr. Penrose, will doubtless be eventually consulted, whatever is done.

Edwd. C. Robins.

Sir,—Mr. Clayton's special pleading must not divert us from the main object of the contention, and that is, to preserve Thornhill's admirable general arrangement from being overlaid and effaced by a scheme that will not bear critical analysis, and which, if carried out, would ruin the dome as an architectural feature. To carry out the complete decoration of St. Paul's, it may be admitted that Thornhill's monochromes cannot be retained intact. But when their utter annihilation is threatened, I say, no! We are bound upon principle, not only out of respect to the artist, and to the architect, but also in recognition of the general appropriateness of Thornhill's scheme, with some admissible alterations, to retain them. I never contemplated that process of effacement by overpainting, which so exercises Mr. Clayton's imagination: my proposal is to use Thornhill's works as *cartoons* for mosaic, just as it is proposed to use the experimental designs. Would Mr. Clayton consider the translation into mosaic of the work of Sir Frederick Leighton and Mr. Poynter, as the effacement and ruin of those eminent painters' designs? Would not the mosaics be virtually their designs still?

In so far as the preservation of early work is concerned, Mr. Clayton must very well know that, in the progress of sculpture in Greece and of painting in Italy from their infancy to their maturity, the earlier, imperfect works were, in the main, preserved, or we should have been in ignorance of the characteristics of that evolution. A few exceptions do but prove the rule. We moderns, too, are bound to cultivate a similar kind of reverence for the disproportions inevitable in the past, and of this virtue we should have expected to find Mr. Clayton an exemplary exponent.

W. Cave Thomas.

October 10th, 1884.

"CROSIER" AND "PASTORAL STAFF."

Sir,—An editorial note to above relating to the curved summit of the Sacraments-Haüslein at Nuremberg draws a distinction between an "archbishop's crosier" and a "bishop's pastoral staff." May I be permitted to say that this is an error? The archbishop's processional cross is quite distinct from his crosier. This latter, which belongs to him as bishop, not as primate, is nothing more than the crook or pastoral staff common to all his episcopal brethren.

This erroneous distinction, which is very prevalent, is based on false etymology. The connexion between "crosier" and "cross" is apparent only, not really, except so far that both words are ultimately derived from the same root. "Crozier," or "Crosier," is really synonymous with "crook," and is derived from the Celtic root, *krog*,—a hook, a bend, an angle,—from which also a considerable number of very familiar words descend, *e.g.*, crotchet, crochet, croquet, cricket, crutch, crouch, encroach, &c. Edmund Venables.

The Precentory, Lincoln.

*** When the difference of opinion lies between two such learned authorities as Dean Hook, whose words were quoted in the note referred to, and the Precentor of Lincoln, the controversy must be approached with due deference to each. The latter, however, admits that "cross" is ultimately derived from the same root as "crosier"; in order, therefore, to avoid confusion amongst the many derivatives from "krog," there may be some convenience in distinguishing the pastoral office of a bishop by speaking of his "pastoral staff." The French have somewhat similar, but distinct, words for crook, crosier, and cross, namely, *croc*, *crosse*, and *croix*.

It would certainly seem that there was in Mediæval times a distinction between the archbishop's crozier and the bishop's pastoral staff. Dr. Lee, in his *Directorium Anglicanum*, describes the archbishop's crozier as a cross borne on a staff, the lower end of which is pointed (as in the pastoral staff). He goes on to say, however, that it is never carried by the archbishop himself, but by one of his chaplains. No authority is quoted for this negative assertion, whereas in MSS. of the thirteenth century we find drawings of archbishops who are represented as holding in their hands croziers exactly answering to Dr. Lee's description. This seems to prove the existence of a cross-headed staff peculiar to archbishops, and distinct from the pastoral staff as well as from the processional cross.

EGHAM SCHOOL BOARD COMPETITION

Sir,—In response to the advertisement inserted in your issue of the 13th of September, I received applications from 103 architects and other persons desiring further information *re* new schools, in order to prepare designs. Of these applicants, forty-nine have forwarded complete sets of plans and specifications. As the larger portion of these have evidently been prepared at considerable cost, the Board consider that it will be only just towards the competitors that a corresponding amount of pains should be expended, and competent assistance sought in making a selection. This will, of course, involve some little delay in adjudication of premiums. Will you allow me, through the medium of your widely-circulated paper, to inform those gentlemen who have sent in designs that arrangements have been made for the plans to be exhibited in the large hall of the Egham Literary Institute, for the better examination of the designs by the Board, and that on the 24th and 25th of October, between the hours of ten a.m. and four p.m., the plans will be open, under certain restrictions, for the inspection of any ratepayer or other person interested in the education of the young. Should any of your readers, including the competitors, like to avail themselves of this privilege, I shall be pleased to hand them admission tickets to the hall on their communicating at once with me.

Benjamin Tice,
Hon. Clerk, Egham School Board.

SEA-SAND FOR MORTAR.

Sir,—Will any of your readers be kind enough to inform me whether any objection exists to using sea-sand in mortar for house-building purposes? I am now building a house at the sea-side, and being under the impression that the mixing of sea-sand with the mortar tended to produce dampness in the walls in damp weather, I specially requested the architect to insist on the contractors using other than sea-sand with the mortar. The architect, however, does not share my prejudice against sea-sand, and assures me that it is not open to the objections above stated.

A reply from any one having experience on this question will greatly oblige. F. L.

*** Our correspondent does not state whether the architect compelled any process of washing or cleansing the sand from salt. It turns mainly on that, Mechanically, sea-sand is often one of the best sands that could be used for mortar, owing to its sharp and crystalline character; chemically, it is always hazardous at the best, owing to the difficulty of clearing it from salt, a very small percentage of which is sufficient to prevent the mortar setting properly, and to cause dampness and efflorescence on the walls.

SCREW-DRIVERS.

Sir,—In the last number of your journal [p. 511, *ante*] I noticed an interesting description of a novel screw-driver.

The many years that screw-drivers have been in use I have never seen one that has been properly adapted to fit the modern screws; they either have a tendency to split the head of the screw, or to slip out of the saw-cut. The form that I have made for my use is one with the end rounded and more flat.

The groove in screws as now made is cut with a small circular saw; and I have found that a screw-driver made to fit the screws is all that can be desired. The screw-driver can be used at any angle with the screws, and will always bite, and is always inclined to keep in the centre of the cut.

W. R. Bousfield.

LIQUID REFUSE.

Sir,—An injunction has been served upon a client, restraining him from turning liquid refuse from printing and dye works into the public sewers.

Can you, or any of your readers, suggest any method of clarification, or point out any examples of successful treatment in such cases? A. B.

A Festive Gathering.—On Monday evening last, Mr. James Forsyth, architectural sculptor, Finchley-road, gave a supper to the men in his employ, on the occasion of the majority of his eldest son, Mr. James Forsyth, jun. On the cloth being removed, Mr. Meadows, foreman of the wood department, rose and said he had a very pleasing duty to perform, which was to call upon Mr. Williams, foreman of the stone department, who acted as vice-chairman (Mr. Forsyth himself acting as chairman), to present to Mr. Forsyth, jun., on behalf of the men, as a token of the respect and esteem in which he was held by them, a handsome dressing-case. Mr. Forsyth, in acknowledgment, said he regarded the kindly feeling which had prompted the gift, not only as a great compliment to himself, but also to his father. A very pleasant evening was passed.

The Student's Column.

ON THE CONSTRUCTION OF FLOORS.

III.

THE *girders* of a *framed floor* have to carry the whole weight of the floor on one, two, three, or more points, according to the number of the binders framed into them, and the distance apart of the binders, as described in a former article, so that the load can hardly be said to be uniformly distributed along the beam. When the girders are placed 10 ft. apart the scantling may be found by the following rule, which will be found sufficiently near to suit all cases. Divide the cube of the length (in feet) by the breadth (in inches), and multiply the quotient by 6 for ordinary floors, and by 18 for those of warehouses, the result is the cube of the depth (in inches).

For example, if the length of bearing is 20 ft. we have the cube of 20 is 8,000, and if we assume the breadth to be 10 in., 8,000 divided by 10 is 800, which multiplied by 6 gives 4,800 as the cube of the depth, the cube root of which is nearly 17 in., the depth for ordinary floors; if multiplied by 18 we get 14,400 as the cube of the depth for warehouses, the cube root of which is nearly 24½. If the breadth is 12 in. then, by this rule, the cube of the depth is 4,000 for ordinary floors, of which the cube root is about 15⅞ the depth; for a warehouse floor the cube of the depth is 12,000, the cube root of which is about 22⅞ the depth required.

With a bearing of 30 ft. let the breadth be 15 in., the cube of 30 divided by 15 gives 1,800, which multiplied by 6 gives 10,800 as the cube of the depth, or 22⅛ in. for the depth of a girder for ordinary floors; and 32,400 as the cube of the depth for a warehouse, or 32 in. for the depth. In this case it would be almost impossible to obtain a solid beam of fir of the required depth, and a built-up one might be used of the pattern described in a former article and shown by fig. 6; or a trussed beam of less depth might be used of the description shown by fig. 5. (See p. 475, *ante*.)

Girders should be made to rest at their ends upon stone templates not less than 2 ft. long by the full thickness of the wall, on which they should bed at least 9 in., so as to distribute the load over as large a portion of the wall as possible. A space of 1 in. or 2 in. should be left round the ends to allow a free circulation of air and prevent dry rot.

With very long timber girders that have to carry a heavy load it is advisable to introduce a support in the middle, by which its strength is more than quadrupled, and a smaller depth of timber can be employed. The weight that a pillar placed at the centre will have to support may be taken as half the load which rests upon the girder, and the sectional area of a long square pillar may be found by the following rule:—Multiply the weight in tons by $\frac{5}{4}$ for fir, and by $\frac{10}{11}$ for oak; multiply the square-root of the product by the length in feet; the result is the sectional area of the pillar. For example, suppose a girder 30 ft. long has to support a load of 45 tons, and that half of this, or 22½ tons, is thrown upon a central pillar of oak, whose length is 12 ft.; 10-11ths of 22½ is 20·45, of which the square root is 4½, and this, multiplied by 12, gives 54 square inches for the sectional area, or nearly 7½ inches square. The girder ought not to rest immediately on the head of the pillar, as it is liable to be bruised thereby, and a 3-inch *template* of oak, about 2 ft. long by the width of the girder should be placed on the top of the pillar, which should also be tenoned into the template.

Timber girders may be greatly strengthened by the addition of a plate of iron in the following manner:—The beam is sawn down the middle and reversed, as described in the former article, and a thin plate of rolled iron, the exact depth and length of the beam, is placed between the two halves or *flitches* as they are called, and iron bolts are passed through the timber and iron, which has previously had holes drilled to receive them, so as to hold them all firmly together. This is termed a *flitch-girder*, and, if the flitches are each 5 inches thick and the iron ½ inch thick, the strength of the composite beam will be about double that of the timber without the iron plate. This arrangement enables us to reduce the depth of the girder while retaining the required strength, and the cube of the depth need only be half what it should be when there is no iron plate, for the same breadth and length. Thus we have just seen that for a length of 20 ft. and breadth of 10 in., the cube of the depth is 4,800, or the depth nearly 17 in.; but, with a ½-inch iron plate, the cube of the depth will be 2,400, or the depth 13½ inches, the proportions being as 4 to 5.

Where there is not sufficient depth to allow of a double-framed floor with timber girders, binders, and joists, the space can be economised by using rolled iron beams of I section, as G in fig. 7, in place of the timber girders, the ends

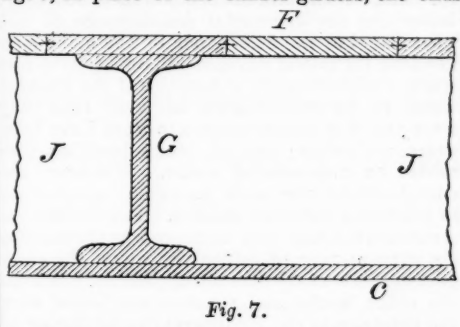


Fig. 7.

of which may be made to rest upon stone templates in the walls at intervals of 10 ft. or 12 ft.; the joists, J, are cut the same depth as the iron beams, and their ends fitted into the space between the flanges and resting on the lower flange, as shown in the figure. The floor, F, can be laid on the top of the joists in the usual manner, and the ceiling laths, C, nailed to their underside. For ordinary floors a rolled iron beam, 12 in. deep and 5 in. wide, weighing 42 lb. to the foot, will form a girder sufficiently strong to carry a floor over a span of 20 ft. For warehouse floors two such beams placed one on the top of the other and riveted at the flanges, as in fig. 8, should have

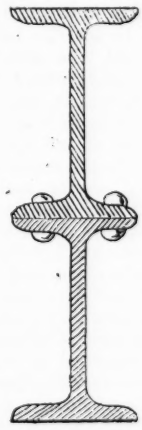


Fig. 8.

four times the strength of the single beam; the greatest strength of the girder is, however, in this arrangement placed at the middle of the depth where the strain is the least, so that there is a considerable waste of material which adds to the load without increasing the strength; and such a beam can hardly bear more than three times the load of the single beam. As, moreover, its depth of 24 in. might prove inconvenient, a better arrangement is to place the two beams side by side with a ½ in. plate 12 in. wide riveted on the top and bottom, as shown by fig. 9,

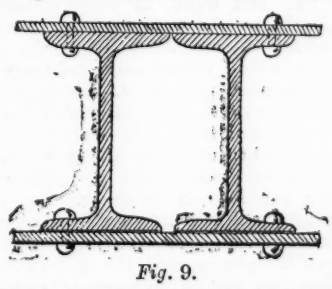


Fig. 9.

where the same strength is obtained with little more than half the depth; the greatest strength in this form of beam being placed at the top and bottom where the principal strains are exerted.

Instead of letting the joists rest upon the lower flange of the iron beam, as at J in fig. 7, it would be better to use binders rather less than the depth of the girder, and lay light joists across them to carry the floor and ceiling as shown in fig. 4 of the last article. This plan would require less timber, and the depth would be nearly the same.

Hitherto we have confined our attention to the use of timber in the construction of floors, since by far the larger number of dwelling-houses, as well as other buildings, have their floors made of that material. The use, however, of iron as a constructive material has of late years so greatly extended, that its application as a support for the floors of buildings claims a large share of our attention. The form in which iron is now most commonly employed for flooring purpose is that of the rolled joist of I section, as described in our last article, and shown in figs. 7, 8, and 9. These joists can be obtained in a great variety of sizes and weights, from 3 in. to 20 in. in depth, and weighing from a few pounds up to nearly 1 cwt. per foot of length. Joists of ⊥ pattern are also made, but these do not possess so much strength for the same weight of metal as those of I section, although in some cases they are more convenient to use.

The load in tons that can be safely distributed over the length of a rolled iron joist of I section, can be approximately calculated by the following rule, where the length between the supports is taken in feet, and all other dimensions are to be expressed in inches:—Multiply the cube of the full depth by the breadth of the top or bottom *flange*; then multiply the cube of the depth in the clear between the *flanges* by the breadth less the thickness of the *web* or vertical part; deduct the latter quantity from the former, and divide the *remainder* by one and a half time the product of the full depth into the length of span. The quotient is the safe distributed load in tons that may be laid on the beam; but if the load is all placed at the middle, the strength will be reduced one-half. For ordinary floors we reckon the load at 1 cwt. to every square foot of surface, or half a ton to every foot length of a girder, where the girders are placed 10 ft. apart. For warehouses, three times the above must be taken as the load. For example, we will take the case of a rolled beam of I section having a span of 20 ft., and carrying the joists directly on its lower flange, so as to distribute the load uniformly, as described in fig. 7 of the last article; the depth being 12 in.; the width, 5 in.; the thickness of web, ½ in.; and the clear depth between the flanges, 10½ in. Then the first quantity, by the above rule, is 5 times 1,728, or 8,640; the second quantity is 4½ times 1,158, or 5,211; the difference of these two quantities is 3,429; the third quantity is 1½ time 12 times 20, or 360; and 3,429, divided by 360, gives 9½ as the number of tons that can be safely distributed over its length of 20 ft., which is very nearly half a ton to each foot of length. For a warehouse floor, we may use two such beams placed one on top of the other, as shown on fig. 8 of the last article, by which means the strength is increased threefold, and the stiffness to a still greater degree; or we can place two joists side by side, and rivet a plate on the top and bottom, as shown at fig. 9 (see last article). The same rule will apply in this last case as in the former one for calculating the strength.

For example, let the span be 20 ft., and two joists, 12 in. by 5 in., placed side by side, with a ½ in. plate 12 in. wide, riveted on top and bottom. The full depth is 13 in.; the breadth, 12 in.; the clear depth, 13½ in.; and the clear breadth, 11 in. Then the first quantity, by the above rule, is 12 times 2,197, 26,364; the second is 9 times 1,158 or 10,422, plus twice 1,728, or 3,456, making altogether, 13,878. Their difference is 12,486, which, divided by 1½ time 13 times 20, or 390, gives 32 tons as the safe distributed load, or a little over 1½ ton per foot of length.

As it is important that we should know the amount of deflexion a given load will produce on a beam, we can calculate it by a rule similar to that given above for the strength, only the quantity there used as the numerator is inverted and becomes the denominator in this case. Multiply the cube of the length (in inches) by the load to be laid on the middle of the beam (in tons); divide this by the *remainder* found in the last rule multiplied by 40,000; the quotient is the deflexion in inches. But if the load is uniformly distributed the deflexion will be five-eighths of the above.

Thus in the example given above of the I joist 12 in. by 5 in. and 20 ft. long, with a load of 9½ tons, the dividend is 9½ multiplied by the cube of 240; the *remainder* is 3,429, which multiplied by 40,000, is the divisor; the quotient

is ·96 the deflexion in inches when the load is all at the centre; but, as in this case, the load is supposed to be distributed over the length of the beam, we take five-eighths of the above, or ·6 in. as the deflexion in the middle, which is rather more than one-fortieth of an inch to every foot as prescribed by Tredgold for the maximum deflexion of floor beams, being, in fact, one thirty-third of an inch for every foot length of the beam.

In the example of the double-beam, given above, we have 32 multiplied by the cube of 240 for the dividend, and the remainder 12,486 multiplied by 40,000 for the divisor; the quotient is ·88 in. as the deflexion if the load was all at the centre, five-eighths of which is ·55 in. when the load is distributed, or nearly one thirty-sixth of an inch to every foot of length.

A girder suitable for a warehouse floor of 30 ft. span can be made with two beams of I-section, each 16 in. deep and 6 in. wide, and weighing 62 lb. to the foot, placed side by side, and connected with a ⅜-in. plate 14 in. wide at top and bottom, or else two ½-in. plates at the top, and one ½-in. plate at the bottom. By the rule given above it is found that this girder can be safely loaded with 45 tons distributed over its entire length, or 1½ ton to each foot.

For a warehouse floor of 40 ft. span we should require to use two beams of I-section, each 19¾ in. deep and 7 in. wide, weighing 100 lb. per foot, placed side by side, and united by a 1-in. iron plate 15 in. wide riveted to the top and bottom flanges, the thickness of the web being ¾ in., and of the flanges 1¼ in.; such a beam will be found by the above rule to be capable of bearing a distributed load of 60 tons, or 1½ ton per foot of length.

When the span of the warehouse exceeds 20 ft. it will generally be found economical to support the middle of the girder on a cast-iron column, by which means the strength is increased fourfold, while the stiffness is increased in a much greater degree; so that beams of much lighter weight can be employed. With a span of 30 ft. we may consider that the column has to bear a load of 22½ tons; if the length of the column is 12 ft., then the diameter must be at least 5¼ in. if solid, and 7 in. external diameter if hollow, with ½ in. thickness of metal. If the length of the column is 18 ft., its diameter if solid must be at least 6¾ in., and 8½ in. external diameter if hollow with ½ in. thickness of metal.

MEETINGS.

Monday, October 20.

Plumbers' Congress at International Health Exhibition. 11 a.m.

Friday, October 24.

Architectural Association. — The President's Address. 7.30 p.m.

Miscellanea.

Architecture in relation to Landscape Gardening.—Mr. G. Richards Julian delivered the second of his course of lectures at the Crystal Palace on Wednesday afternoon last. The subject of this lecture was "Roman and Romanesque Architecture." The lecturer commenced with an explanation of the relative positions of the Etruscans and the infant Rome, drawing attention to the fact that the Romans derived the semicircular arch and the circular plan for temples and tombs from the ancient Pelasgic inhabitants of Etruria, or Tuscany. The absence of any architectural development during the existence of the Republic, and the enormous activity of the Roman emperors in building, not only in Rome itself, but in all her subject provinces, were then pointed out, notice being takan of the fact that while almost all the remains of Grecian architecture are to be found in temples, the Romans have left behind them not only temples, but baths, amphitheatres, basilicas, forums, and triumphal arches and columns. The effect on the Romans of the conquest of Greece, in the adaptation of the Greek orders as decorative features applied to the arched construction derived from the Etruscans, was described, and a detailed account of the various modifications made in the orders followed. Passing to Romanesque architecture, the characteristics of the early Christian basilicas were noted, and a short digression to point out the rise of the Byzantine style in the East, and some of its leading features, was made. After this the lecturer glanced at the round-arched architecture of Lombardy, of the Rhine valley, and of France.

Liverpool Engineering Society. — The ninth meeting of the session was held on the 8th inst., at the Royal Institution, Colquitt-street, Mr. R. R. Bevis, jun., in the chair, when a paper, entitled "Inland Navigation Works Abroad," was read by Mr. R. L. Tapscott. The author, in treating of his subject, dwelt on the accomplishment of the great canal works of recent years as a result of the improvements in the various mechanical appliances now substituted for hand labour, and the benefits thence arising; instancing the successful maintenance of the Suez Canal as the forerunner of the many suggestions for inland navigation now brought forward. Admitting the difficulties of the Panama Canal to be considerable, he held that they were yet of a similar nature to what have been overcome before; but, all taken together, presented an unparalleled series. Whatever the cost, however, the work had every appearance of proving a financial success. Passing on, the Amsterdam Canal was instanced as illustrating the surmounting of difficulties which the early part of this century dare not approach. Amongst the other works and schemes mentioned were the entrance to the Mediterranean by means of the Garonne River, the flooding of the Sahara, the draining of the Zuyder Zee, the improvement of the Neva, and the piercing of the isthmuses of Malacca, Florida, and Corinth.

The Operation of the Artisans' Dwellings Act was discussed at the last meeting of the Board of Works for the Whitechapel District, when replying to the Rev. Mr. Billing, Mr. Munro (of the Metropolitan Board of Works) said the delay in covering the cleared areas under the Improvement Schemes arose from the land being unmarketable under the conditions attached. As regarded the areas in Spitalfields, new plans were now being submitted to the Home Secretary, and awaited his approval. The Metropolitan Board would, in fact, be glad to let the land at almost any price so as to get the spaces rebuilt over. There had, probably, never been an Act of Parliament so differing in intention and operation. Intended to be a benefit to the poor, it had been a source of misery to them; and of all the people evicted from the Whitechapel District, probably not ten had returned to the new homes built for them at so enormous a cost. The Dwellings' Improvement Act was, in fact, a measure for benefiting certain portions of the middle-class, and the tenements in such places as Royal Mint-street were occupied by persons for whom they were never intended.

Enlargement of the Wimbledon Sewage Farm.—In consequence of the rapid rate at which the population of Wimbledon is increasing, the Wimbledon Local Board have found it necessary to increase the area of their sewage farm for the disposal of the constantly-increasing sewage of the district, which they have found to be very profitable as applied to the land. The area of the Board's farm at present under cultivation is upwards of sixty acres in extent, and to this about nine acres is about to be added, land for the purpose having been purchased by the Board immediately adjoining the present farm. This land is situated on the main road from Merton and Wandsworth, lying between the River Wandle and the South-Western Railway. It has for some time past been occupied as the Wimbledon and Wandsworth brickfields, and last week, in consequence of the Local Board requiring immediate possession of the land for their sanitary works, the whole of the brickmaking plant and machinery on the ground was sold by auction. In illustration of the expansion of the district within the area of the Local Board, it may be stated that during the present year upwards of 1,000 new houses have been erected, whilst in addition large numbers are now in progress. Several land companies have recently purchased estates in the locality, including the British and the Birkbeck companies, and the last-named company has just laid out upwards of one hundred building sites in Queen's-road, South Wimbledon.

The Plumbers' Congress.— As will be seen by an advertisement in another column, arrangements have been made for the holding of a conference in connexion with the Plumbers' Congress, at the Technical Institute, Health Exhibition, South Kensington, on Monday next. The mayers of forty of the principal towns in England have already accorded their co-operation to this object, and many of the leading practical plumbers in and about London are giving their assistance.

Lifts.—Judging from the frequency with which we receive particulars of new lifts and lifting machinery, that branch of mechanical engineering is in a prosperous condition. That it is likely to remain so may be inferred from the ever-increasing height of town-buildings, which renders the use of lifts an absolute necessity. Among the firms who have "laid themselves out" for lift-work are Messrs. Archibald Smith & Stevens, of Queen's-road, Battersea, and the American Elevator Company, of 38, Old Jewry. Messrs. Smith & Stevens have just completed two sets of hydraulic lifting-machinery in connexion with the Hydraulic Power Company's mains, — one at Messrs. Spencer Wicks & Co.'s new premises in Watling-street, E.C., and the other at Mr. A Steddall's premises, Addle-hill, E.C. This new system of public supply of hydraulic power is, we are told, finding very extended application. The same firm have also in course of construction for the Mont Doré Sanatorium, Bournemouth, two hydraulic passenger lifts upon Stevens & Major's patent suspended principle. America is renowned for its lifts, which were in general use in the States while they were only to be occasionally met with in this country. The development of lofty buildings used as residential flats, in New York especially, would probably never have been attained to without the aid of the system of lifts which is in vogue in America. The American lifts differ in some essential points from those in use in this country, and the American Elevator Company, believing that its productions will commend themselves to English architects, are introducing them here. The Company has lately received an order for one of their "Standard" hydraulic lifts for passenger service, and especially for the use of invalids, to be erected in the London Temperance Hospital, Hampstead-road. The American Elevator Company claim that their New York and Chicago houses (Messrs. Otis Bros. & Co. and W. E. Hall & Co.) have produced more than half of all the elevators "running" in the States.

The last of Sion College Buildings.—In a few days the last remaining buildings in connexion with old Sion College will have finally disappeared. The hall has already been taken down, as well as several other buildings belonging to the college estate, and the whole of the site of the college having now been let on building leases, Messrs. Fox & Bousfield last week sold the materials of the library, and the ancient gatehouse in London Wall,—the sale of the library, in addition to the building itself, including the bookcases, book-shelves, and fittings. In taking down the library, arrangements have been made for the preservation of the stone in the Philip-lane frontage which records the circumstances under which the college was originally founded, together with the re-erection of the college buildings after their destruction by the Great Fire of London. We understand that this stone is intended to be placed in the new college buildings now in course of erection on the Thames Embankment. We also learn that the valuable collection of books forming the library will be deposited in temporary premises in Aldersgate-street, pending the completion of the new hall and library. The new buildings to be erected on the site now being cleared are all of a commercial character with frontages in London-wall, Philip-lane, and Aldermanbury-avenue.

Surrey Archæological Society.—At the ordinary monthly Council meeting of this Society, at 8, Dane's Inn, held last Wednesday, the 15th inst., two new members were duly elected, viz., Colonel de Cetto and Mr. John Pettit Griffith. After the Council meeting was over, a special general meeting of the members of the Society took place, Mr. Granville Leveson Gower, F.S.A., presiding, when the following resolution was unanimously adopted:—"That Rule 13 be altered in such a manner that the annual general meeting be hereafter held in the month of January or February, instead of the month of June or July, as at present."

The Fine Art Society. — The following exhibitions will be held by the Fine Art Society during the autumn:—(1) Sketches in France, Italy, Spain, and other countries, by Ernest George (to open on Monday next); (2) The works of Linley Sambourne; (3) Venetian and Italian Drawings by the Russian painter, Count Roussoff; (4) Pictures and Drawings by J. D. Linton.

Messrs. Farebrother, Ellis, Clark, & Co.'s New Premises in Fleet-street.—For several months past the premises in Fleet-street, nearly opposite St. Dunstan's Church, which for some years were occupied as the West-end offices of the Norwich Union Insurance Company, have been undergoing extensive alterations. The building, which contains five floors, with an elevation to Fleet-street upwards of 60 ft. in height, is faced with grey and red polished granite and Portland stone, in which a profusion of carving and sculpture is introduced. The whole of this frontage has been cleaned, and, where necessary, re-faced and restored. Internally the building has been re-constructed and entirely re-arranged, and enlarged in the rear by the construction of new buildings about 100 ft. in depth, extending to the boundary of Goldsmith's-court and the Temple Church. The whole of the interior has been fitted and arranged for Messrs. Farebrother, Ellis, Clark, & Co., the well-known auctioneers, surveyors, and estate agents. The ground-floor, extending from the Fleet-street entrance to the rear of the building, has been arranged in several separate departments, and contains, amongst others, the general office, also the office for the sale and letting of houses and estates, cashier's office, accountants' office, estate and drawing office, London and Country Sales offices, waiting-room, and other offices. Sir J. W. Ellis's private office and waiting-room are on the first floor, facing Fleet-street, and at the rear of this floor are the architect's office and the drawing-office. The second floor is appropriated to agency in connexion with landed estate and estate sales. The third and fourth floors are set apart as the housekeeper's residence. In the basement are several strong-rooms and lavatories, also a gas-engine for working the dynamos for the electric light by which every apartment in the establishment is lighted.

The Steel Square.—Pliny says that Theodorus, a Greek of Samos, invented the square and level, but this cannot be, for the square figures in the represented designs of the Tower of Babel, one of the earliest known structures. The city of Babylon was a perfect square, and the bricks used in its buildings and walls were square; so probably were those in Babel. Now, to form small squares correctly, and to introduce them in endless combination into buildings, it needed a guiding instrument of some kind. So the square, as a constructive tool, came into use. Among the ruins of Babylon, Nineveh, and Petra, it is said to have been found represented. There are pictures and sculptures from the ruins of Thebes, in Egypt, showing the square in the hands of the artisan. Evidence of its use are also to be seen in ruins in India, which are thought by some to ante-date those found in Egypt. Among the ruins of the Aztecs, or the people before them, in Peru and Brazil, it has also been found; and though tools of stone and flint, such as axes, hatchets, hammers, &c., were the first used by primitive man in these ruins that date back beyond history, the square is found, and specimens may be seen in the British Museum.—*Iron.*

Building at Tulse Hill and Dulwich.—In connexion with many other suburban localities, building has been proceeding at a rapid rate during the last few years in the neighbourhood of Tulse Hill and Dulwich, and with the view of still further developing building operations in the district, a new company has just been formed for the purpose of purchasing the Tulse Hill Park Estate, and also the Manor House Estate at Dulwich, consisting of several acres, and stretching a considerable distance in the direction of Sydenham. Some two or three years ago this estate was laid out for building upon, when the old Manor House was demolished. The capital of the new company is 150,000*l.* in 10*l.* shares.

The Association of Municipal and Sanitary Engineers and Surveyors is to hold a Northern District meeting this day, Saturday, the 18th of October. The members will assemble at the Town-hall, Stockton, at 10.30 a.m., so that the ordinary business may be transacted in time to leave the Corporation Wharf by steamer, at 11 o'clock sharp, to inspect the lighthouses, breakwater, and other river works at Tees Mouth. Mr. John Fowler, M.I.C.E., Engineer to the Tees Conservancy Commissioners, will explain the river works.

New Bridge at Bedford.—The works in connexion with the construction of the new iron roadway bridge and approaches over the River Ouse, for the Corporation of Bedford, are now nearly completed, and preparations are being made for the opening, which will take place on Tuesday next, October 21st, the Right Hon. Earl Cowper, K.G., performing the ceremony. The works have been designed and are being carried out under the superintendence of Mr. John J. Webster, A.M.I.C.E., of Stephenson-chambers, Liverpool, the contractors for the masonry and brickwork, &c., being Messrs. S. W. Pilling & Co., of Manchester, and for the ironwork Messrs. Goddard & Massey, of Nottingham.

Ensilage at Eastwell Park.—The ice house silo of H.R.H. the Duke of Edinburgh was opened about three weeks since. The result has been in every way satisfactory, and a very marked increase has been noted in the yield of milk from those cows fed on the silage. The patent mechanical pressure of Messrs. F. W. Reynolds & Co., of Acorn Works, Edward-street, Blackfriars-road, London, was used in this silo.

Akeley.—The four-light east window of Akeley Church, near Buckingham, has just been with Munich stained glass by Messrs. Mayer & Co. It represents the Birth of Christ, His Baptism, the Angel at the Tomb, and the Supper at Emmaus.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Pier and Landing-stage, Ventnor	Ventnor Local Board ...	.....	Dec. 8th	i.
Drainage	Bexhill Local Board ...	.....	Not stated ...	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Sewers, Gullies, &c.	Commissnrs. of Sewers	*Official*	October 21st	ii.
Guernsey Granite	Staines Local Board ...	.....	do.	ii.
Warehouse, Winchester	Not stated	Thos. Stopher	October 22nd	ii.
Garden Wall, Leatherhead	H. Parr	.....	October 23rd	ii.
Granite Kerb and Tar Paving	Sutton Local Baard.....	J. P. Curtis, C.E.	do.	xviii.
Asphalte Paving	Commissionrs of Sewers	*Official*	October 24th	ii.
Sinking Well	Teignmouth Local Brd	Geo. Crow	October 25th	xviii.
Drainage Works	do.	do.	do.	xviii.
Enlargement of Post-office, Yarmouth	Commissnrs. of Works	*Official*	October 27th	ii.
Paving	Camberwell Vestry.....	do.	do.	ii.
Portland Cement	Ramsgate Town Council	do.	October 28th	ii.
Granite Siftings	do.	do.	do.	ii.
Construction of Sewer	Kensington Vestry	do.	do.	ii.
Making-up Roads	Wandsworth B. of Wks.	do.	do.	ii.
Stoneware Pipe Sewers	Swansea U. S. A.....	R. H. Wyrill.....	October 29th	xviii.
Paving	Greenwich Bd. of Wks.	*Official*	do.	ii.
Road Making and Paving	Fulham Board of Wrks	do.	do.	ii.
Road Making	Dartford Local Board	do.	do.	xviii.
Public Baths, &c., Ealing	Local Board	Chas. Jones, C.E.	Nov. 3rd	xviii.
Boundary-Walls and Railing, &c.	Waltham Holy Cross Burial Board	C. W. Wiggs.....	do.	ii.
Farmhouse, &c., Fulstow	Trustees of A. H. Allenby	E. W. Farebrother	do.	ii.
Drainage, &c., of Infirmary	Chelsea Guardians	.....	Nov. 4th	ii.
Extension, &c., of Infirmary Laundry	do.	.....	do.	ii.
Cast-Iron Work	Commissnrs of Sewers, City of London	*Official*	do.	ii.
Concrete, Brick, and Pipe Sewers, &c.	Romford R. S. A.	Brundell, Simmons, & Brundell	do.	ii.
Roads and Sewers, Bournemouth	Bscmbe Con. Land Soc.	R. G. Pinder.....	Not stated	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Applications to be in.	Salary.	Page.
Surveyor, &c.	Wantage Improvement Commissioners	Nov. 1st	100*l.* per annum.....	xvi.

TENDERS.

For painting and sundry repairs at 18, Clevelandgardens, W., for Mr. Henry Rose. Mr. R. Groom, architect, 171, Queen Victoria-street:—

Appleton	£210	18	0
Knight	210	0	0
Woodman	187	0	0
Nash	175	0	0
Buckeridge (accepted)	167	0	0

For a new Wesleyan Chapel at Winchcombe, Cheltenham. Mr. Herbert J. Jones, architect, Bristol:—

E. & T. Hatherly, Bristol	£2,350	0	0
W. Church, Bristol	2,330	0	0
Eastabrook & Sons, Bristol	2,290	0	0
A. King, Gloucester	1,948	0	0
Wingate & Sons, Gloucester	1,865	0	0
W. A. Green, Clevedon	1,857	13	0
T. R. Lewis, Bristol	1,850	0	0
C. Caines, Cheltenham	1,788	0	0
W. Veals, Bristol	1,750	0	0
H. Johnson, Bristol	1,743	0	0
G. Drew, Chalford	1,700	0	0
C. Malvern, Cheltenham	1,610	0	0
G. Essex, Cheltenham	1,468	17	10

For the erection of a dwelling-house and shop in Queen's-road, Hastings, for Mr. E. Hawes. Mr. Alfred W. Cross, architect, Hastings:—

Cruttenden	£1,040	0	0
Phillips	1,035	0	0
Avis	1,030	0	0
Coussens	1,025	0	0
Rodda	1,000	0	0
Harman	955	0	0
Woodall	920	0	0

For the erection of coach-houses, stables, &c., Rockleaze, near Bristol, for Mr. C. J. Lewis. Mr. Joseph W. King, architect, 39, Broad-street, Bristol:—

G. Daltry	£997	5	0
P. H. Taylor	920	0	0
T. Baker	916	0	0
W. Tarr	788	0	0
G. E. Burton	743	16	0
W. Podger	740	0	0
E. Clarke	716	0	0
J. Hayes	700	0	0
E. T. Hatherly	697	0	0
J. E. Davis	696	0	0
J. Wilkins	690	0	0
C. A. Hayes	670	0	0
J. Tucker	669	0	0
W. Veals	664	0	0
E. Mason	638	0	0
E. W. King	627	16	0
J. Thomas	600	0	0
R. J. Cridland*	600	0	0
Williams & Prosser	599	0	0
J. James†	589	0	0

* Accepted. † Too late.

For a pair of semi-detached residences at Crewkerne Somerset, for Mr. Thomas Palmer. Mr. Herbert J. Jones architect, Bristol:—

D. Hitching, Parkstone	£2,294	4	10
J. Bastow, Bristol	1,958	0	0
Lye & Sons, Crewkerne	1,950	0	0
W. Church, Bristol	1,827	0	0
E. & T. Hatherly	1,800	0	0
J. B. Hann, Beaminster	1,798	0	0
T. R. Lewis, Bristol	1,750	0	0
Cowlin & Son	1,750	0	0
W. A. Green, Clevedon	1,648	18	4

[All net, after allowing for old materials.]

For the erection of houses at Barcombe, Sussex. Mr. George Fuller, architect, Lewes:—

Andrews, Lindfield	3,417	13	2
Cheesman & Co., Uckfield	2,940	0	0
Longley, Crawley	2,750	0	0
Wright, Brighton	2,617	0	0
Ditto ditto	2,557	0	0
Huggett & Coster, Eastbourne	2,500	0	0
Berry & Bussey, Lewes	2,270	0	0
Baker, Seaford	2,147	0	0
Woolger, Newhaven	2,100	0	0
Donovan & Son, Eastbourne	2,094	11	8
Pledge, East Grinstead (accepted)	1,900	0	0

For the erection of proposed Parochial Infant School, Balham, and repairs to present school, for "The Committee." Mr. W. Newton Dunn, architect, Bucklersbury:—

Maxwell Bros., Brixton	£1,031	0	0
J. Smith & Son, Norwood	1,007	0	0
J. B. Gerrans, Lee	997	0	0
T. Potterton, Balham	954	10	0
A. Wing & Co., Norwood	905	0	0
W. Dean, Clapham	847	0	0

For alterations and repairs at No. 15, Park-row, Greenwich, for Coffee Tavern, for General de Havilland. Mr. W. Rickwood, architect and surveyor:—

First Contract.

Howell & Son	£180	0	0
Holding & Son	179	15	0
Lonergan	179	0	0
Staines & Son (accepted)	178	0	0
Avard	159	0	0

Second Contract.

Proctor	£621	5	10
A. White & Co.	575	0	0
Mower	554	0	0
Staines & Son	527	0	0
E. Stafford	519	0	0
Holloway	513	0	0
Holding	495	0	0
Lonergan	488	0	0
Pack Bros.	485	0	0
A. & E. Evans (accepted)	449	0	0

For alterations, &c., to Mount House, Dorking. Mr. Frederic W. Ledger, architect, London:—

F. J. Hammond, Dorking	£297	10	0
Burdett & Son, Guildford (accepted)	259	19	3

For stables, Beech Hill Park, Hadley Wood. Mr. Edwin T. Hall, architect, 57, Moorgate-street:—

Woodward	£815	0	0
Marriott	780	0	0
Lynde (accepted)	696	0	0

For billiard-room, &c., for Mr. H. W. Hunt, Dulwich. Mr. Edwin T. Hall, architect. Quantities by Mr. G. A. Pryce-Cuxson, Westminster-chambers:—

W. L. Lynde	£970	0	0
J. & C. Bowyer	932	0	0
Fish, Prestige, & Co.	930	0	0
J. Woodward	910	0	0
H. S. Foster (accepted)	875	0	0

For residence for M. G. J. Brescoby, Chatham. Mr. Edwin T. Hall, architect:—

Leathley	£980	0	0
Batchelor, Merton (accepted)	950	0	0

For machinery, &c., for olive oil and corn mills, Mitylene, Turkey, for H.S.H. The Princess de Lusignan. Mr. Edwin T. Hall, architect:—

Appleby Bros., London (accepted)	£3,970	0	0

For bar fittings at the Albany public-house, Rodney-road, Walworth, for Mr. Hughes. Mr. George Treacher, architect:—

Turtle & Appleton	£375	0	0
Jackson & Todd	349	0	0
Drew & Cadman	324	0	0
J. Beale (accepted)	310	0	0

Accepted for a dwelling-house and outbuildings for Mr. Thomas Huley, at Carleton, near Pontefract. Mr. William Shackleton, architect, Pontefract:—

Excavator, Bricklayer, and Mason.

Thomas Taylor	£138	19	6

Carpenter and Joiner.

William and Charles Wilcock	£129	0	0

Plasterer.

John Binns	£21	0	0

Ironmonger, Plumber, and Glazier.

Caleb England	£22	6	6

Slater.

William Stewart	£30	0	0

For the erection of St. Andrew's Church, Birchills, Walsall. Mr. J. Edward K. Cutts, architect:—

Enoch Evans, Walsall	£5,030	0	0
Restall & Son, Bisley	4,965	0	0
William Winstance, Walsall	4,336	8	0
G. & F. Higham, Wolverhampton	4,113	0	0
H. Knight, Walsall	3,980	0	0
Storey & Son, Bourne	3,924	0	0
Trow & Sons, Wednesbury	3,647	0	0
Jones & Sons, Sedgeley	3,447	0	0
Lowe & Sons, Burton-on-Trent	3,408	0	0
A. Lynx, Walsall	3,325	0	0

For building a residence, "Kingsclear," Camberley, for Major Charles Cooper-King, R.M.A. Mr. James H. Money, architect, Newbury:—

T. H. Kingerlee, Oxford	£2,595	0	0
W. H. Simmonds, Reading	2,590	0	0
Charles Claridge, Banbury	2,495	0	0

For works of underpinning at Glentworth House, Orpington, for Mr. E. G. Allen. Mr. E. P. Loftus Brock, F.S.A., architect:—

W. Bailey	£320	5	0
J. Hocking	275	0	0
J. Laslett	250	0	0

For converting three private houses into shops near Clapham Junction. Mr. Thomas Spearing, surveyor:—

Samuel Steel	£759	0	0!
Jones & Edwards	590	0	0
Robinson & Miller	475	0	0
Howard	441	0	0
Cook & Co.	439	0	0
Saunders & Co.	405	0	0
Charles Rudd	400	0	0
Thompson & Co.	393	0	0
W. Ellis	390	0	0
R. Warr	375	0	0
Stewart & Co.	369	0	0
Hughes & Davis	336	0	0
W. G. Baker	330	0	0
Scharien & Williams	317	10	0
Rand	225	0	0!

For painting, decorating, and sundry repairs at 58, Acacia-road, St. John's Wood, for Mr. Weston. Mr. James Millar, architect:—

Adams	£173	0	0
Struggle	170	0	0
Conway	135	0	0

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

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TO CORRESPONDENTS.

C. & C.—P. H. N.—A. N., Chicago.—C. L.—J. H. (will produce paragraph with the diagram another week).—G. R. D.—R. A. M. C. (next week).—W. H. W. (shall be attended to).—R. T. C.—W. T. W.—E. Van C. (will reply by letter).—W. W. L.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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